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Development of Coal Resources in Southern Utah
Part 2 Site Specific Analysis

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FINAL ENVIRONMENTAL STATEMENT

Cover photograph: View of the southern part of the Kaiparowits Plateau, looking north toward Fourmile Bench.

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FINAL

ENVIRONMENTAL STATEMENT

U.S. Geological Survey

DEVELOPMENT OF COAL RESOURCES
IN
SOUTHERN UTAH

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DEVELOPMENT OF COAL RESOURCES
IN SOUTHERN UTAH

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PART 2. SITE SPECIFIC ANALYSIS

- A. RED AND BLUE MINES
- B. KAIPAROWITS NOS. 1-5 MINES
- C. ALTON STRIP MINE

SITE SPECIFIC ANALYSIS
OF THE PROPOSED RED AND BLUE MINES
KANE COUNTY, UTAH

Lease numbers:

Red mine: U-0115791
U-0115792
U-0115793
U-0130989
U-24427
U-27835

Blue mine: U-083005

PROPONENT: EL PASO COAL COMPANY

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CHAPTER I

DESCRIPTION OF PROPOSED ACTION

A. INTRODUCTION

The El Paso Coal Co. has submitted plans for approval to mine 6.8 million tons of coal per year (mty) from two underground mines. The proposed Blue mine would produce 0.5 mty and the proposed Red mine would produce 6.3 mty from a leasehold consisting of 27,659 acres of Federal land and 12,887 acres of State land. The company anticipates placing the Blue mine into production first; implementing the Red mine proposal would require both major road upgrading and a new transportation system. This environmental analysis details the impacts that would result from approval of these mining plans.

The company has also submitted preliminary plans for transportation, utilities, and other facilities that will be needed to support the mining operations. Some of these facilities will be off the lease area. Lack of detail in these preliminary plans prohibits a comprehensive environmental analysis; however, the anticipated major impacts have been identified. Future Federal actions and additional environmental assessment will be required when applications and detailed plans for these proposals are submitted for approval.

The components of the mining plans now awaiting Federal action and the preliminary proposals requiring Federal action at some later date are given in table 1.

B. PROPOSED ACTIONS

El Paso Coal Co. lease holdings are on the Kaiparowits Plateau about 30 miles north of Page, Ariz., and about 28 miles south of Escalante, Utah. The 40,546 acre lease holding has been divided into four reserve areas (fig. 1). The company proposes to mine reserve area A through the Red mine and reserve area C through the Blue mine. Plans for reserve areas B and D are not submitted.

Nine coal seams have been identified in the lease area by exploration drilling as shown in table 2. Of these nine seams, only six will be mined from the Red mine and two from the Blue mine. The Red mine would produce 200 million tons over a projected 38-year mine life and the Blue mine 6 million over a 12-year projected mine life. Coal recovery would be 50 percent of estimated inplace reserves. Excess coal thickness and minimum seam separation preclude greater recovery under present technology.

Blue mine

The Blue minesite facilities would be located on State land in sec. 16, T. 40 S., R. 4 E., in a side canyon to Dry Wash (figs. 2, 3). The

TABLE 1.--Summary of mining plan and preliminary proposals

	Red mine (Reserve area A)	Blue mine (Reserve area C)
Proposed mine (approximate acres):		
Federal	3,320	240
State	1,280	240
Total	4,600	480
Product	Washed coal.	Raw coal.
Market	Unspecified utility companies.	Unspecified utility companies.
Estimated coal reserves (millions of tons):		
In place (mining plan)	622	12
Recoverable	200	6
Expected mine life (years)	38	12
Production rate (mty)	6.3	.5
Development schedule (months):		
Initiation to production	24	6
Initiation to full production	96	24
Ancillary requirements (off lease):[1]		
Access roads (company) (miles)	0	6
Access roads (State or county) (miles)	30	30
Powerlines (miles)	25-35	25-35
Water wells (each)	7	1 or more
Railroad	(2)	0
Slurry line	(2)	0
Land surface disturbance (acres):		
Portal facilities	32	33
Washery and plantsite	838	0
Ancillary requirements (off-lease)[2]	Unknown	55
Major resource requirements:		
Water (acre-ft/year)[3] (mining)		
Mining	970	30
Community supply	2,330	170
Lime (rockdust) (tons/year)	30,000	2,500
Personnel requirements:		
Construction	450	40
Mine operation[4]	1,825	145

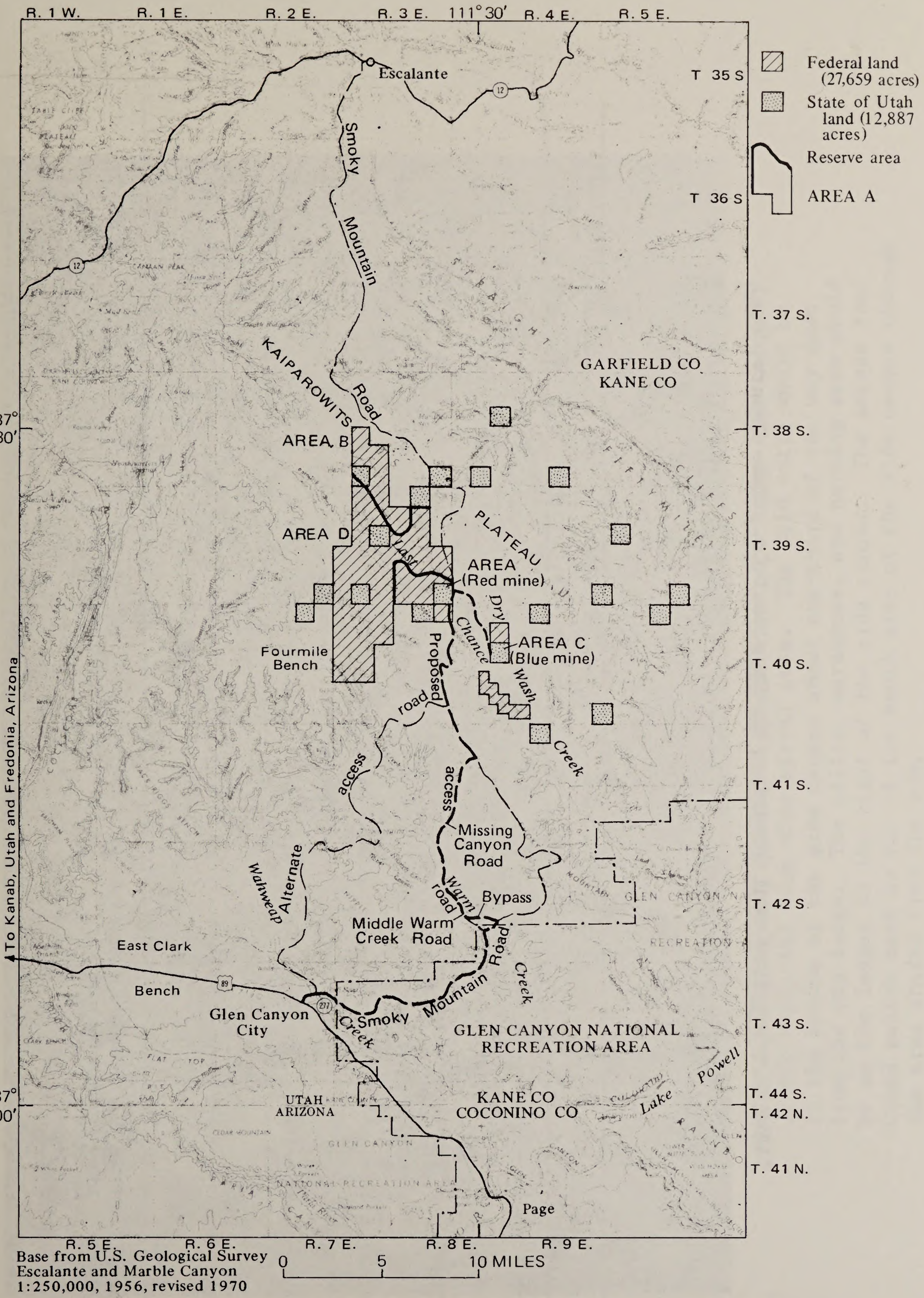
---

[1] Preliminary plans that will require future environmental assessment and not subject to approval as a part of this Federal action; known ancillary facilities will serve both the Blue and Red mines.

[2] El Paso Coal Co. plans to ship this coal via 1 of 3 proposed railroads, D&RGW to Marysvale, Sante Fe to Flagstaff, Ariz., or Union Pacific to Cedar City, Utah, and (or) 1 of 3 slurry lines proposed to Cedar City, Flagstaff or Walsenburg, Colo.

[3] Amounts given are task force estimates; company mine plan shows 960 acre-ft/year for Red mine and 10 acre-ft/year for the Blue mine, but no estimate was made for additional community supply.

[4] 15 tons/manshift, 230 manshifts/year (includes support).



Base from U.S. Geological Survey Escalante and Marble Canyon 1:250,000, 1956, revised 1970

FIGURE 1.--Map showing coal-mining leases and reserve areas, El Paso Coal Company, Kane County, Utah.

TABLE 2.--In-place coal reserves, El Paso Coal Co., Kane County, Utah

[In-place tonnage given in millions of tons (MMT)]

Reserve area and mine name	Reserve classification		Coal seams									Total in-place tons
			H^1	I	J^1	K_1	$K_2{}^2$	L	M^2	N^2	O^2	
A, Red mine	Proven	Average thickness (ft)	6.5	6.4	9.5	7.3	11.4	---	22.7	16.4	9.4	
		Area (acres)	2,906	1,536	3,578	2,522	4,358	---	4,524	4,499	4,045	
		In-place tons (MMT)	34	18	61	33	89	---	185	133	69	622
B, No plan	Indicated	Average thickness (ft)	7.5	14.1	11.8	9.4	7.5	10.3	10.2	6.0	8.3	
		Area (acres)	3,968	3,008	2,752	2,560	2,752	2,944	4,672	2,112	2,560	
		In-place tons (MMT)	53	76	59	43	37	55	85	23	38	469
D, No plan	Inferred, indicated and proven.	21,971 acres	Calculations incomplete but total in-place reserves of coal beds 4 feet thick or greater are estimated to be 1,600 MMT.									1,600
C, Blue mine	Indicated	Average thickness (ft)	7.3	---	11.0	---	7.7	6.2	10.2	10.8	6.3	
		Area (acres)	480	---	320	---	1,200	1,280	1,280	1,280	1,280	
		In-place tons (MMT)	6	---	6	---	17	14	24	25	15	107
Scattered sections, no plan.	Inferred		8,000 acres; information very limited but in-place reserves of coal beds 4 feet thick or greater are estimated to be 250 MMT.									250

---

[1] Coal beds to be mined from both the Red and the Blue mines.
[2] Coal beds to be mined from the Red mine only.

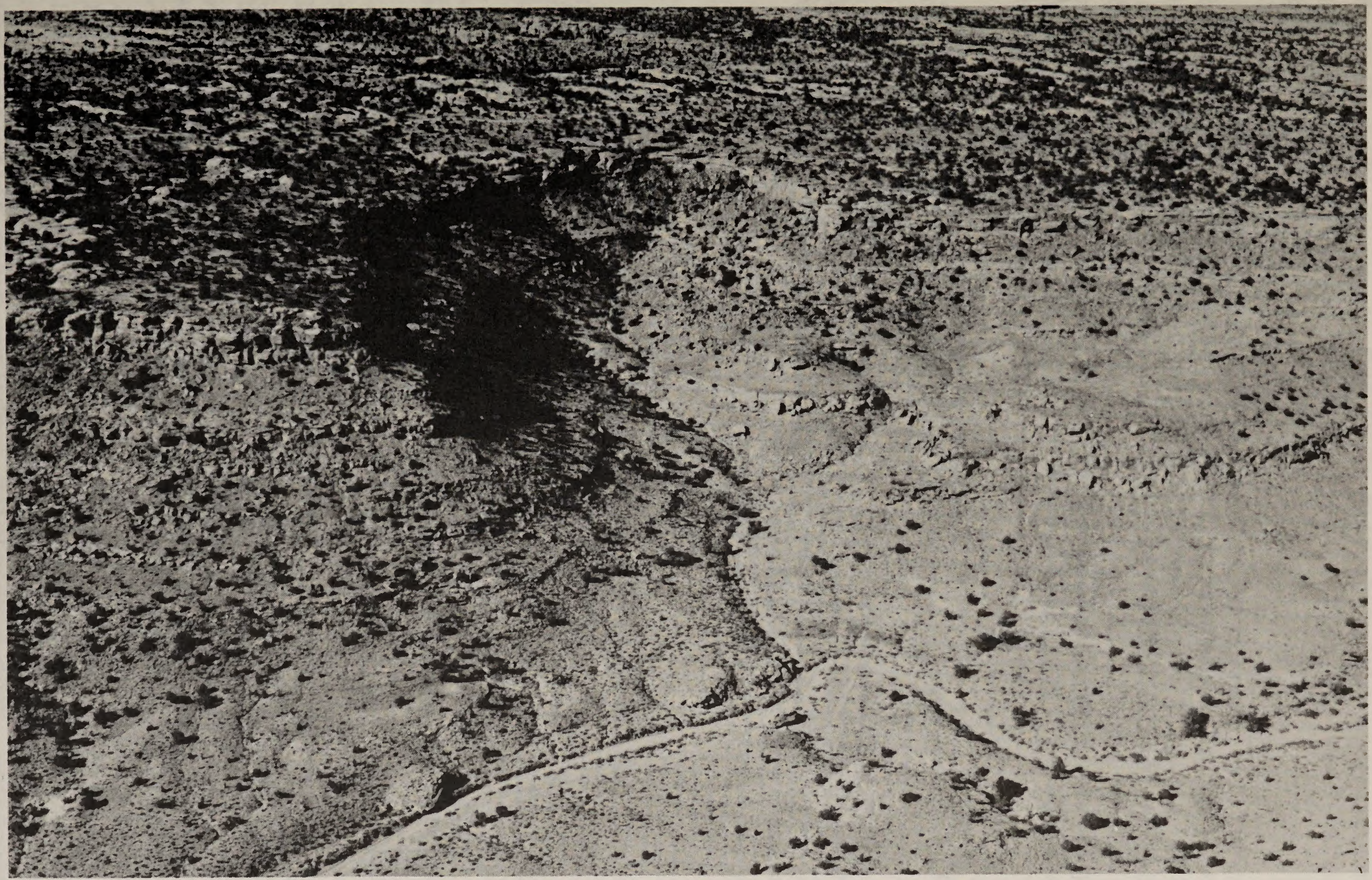
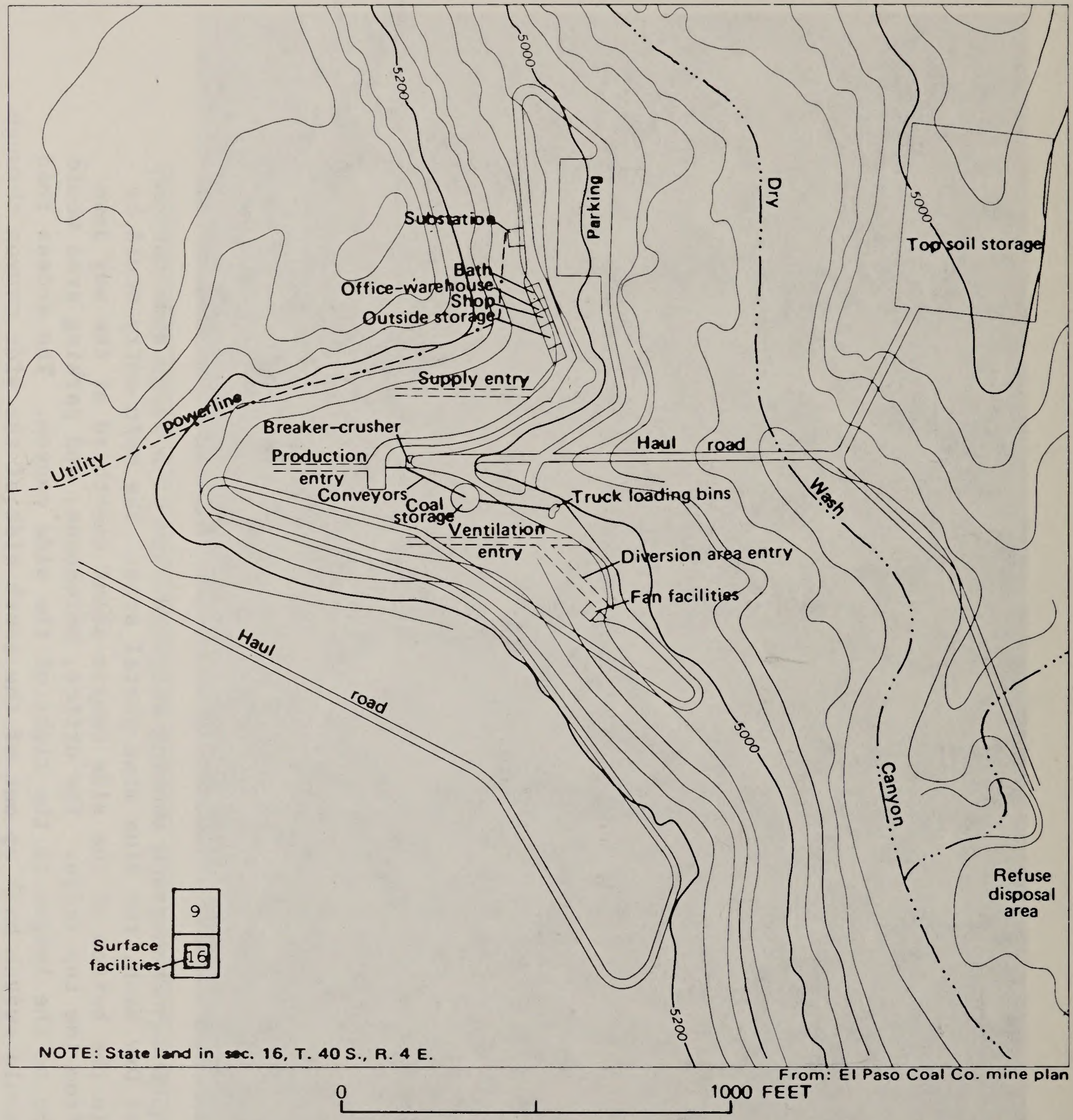


FIGURE 2.--Photograph showing westward view of a ledgy side canyon of Dry Wash, the Blue mine portal area. The main entry would be in the bottom of the side canyon about one-third of the way down from the top ledge. The office, warehouse, and parking area would be on the ledges to the right of the side canyon. The access road would switch back up out of the south side of the side canyon through the area shaded from the sun.



NOTE: State land in sec. 16, T. 40 S., R. 4 E.

From: El Paso Coal Co. mine plan

FIGURE 3.--Map showing surface facilities proposed at the Blue mine, El Paso Coal Company.

production entry would be in the center of the side canyon and would be flanked by parallel entries for ventilation and supply. The office-warehouse-shop building, storage area, and parking would be on the midslope bench area to the north of the side canyon (fig. 3). A haul road would cross the main Dry Wash just above the side canyon drainage to provide access to the top soil storage area and mine refuse yard. (figs. 3, 4).

Entry to the Blue mine would be in the outcrop by five parallel openings, each 20 feet wide, on 100-foot centers. Development in reserve area C would start at the outcrop of the H seam. Crosscuts would connect the entries, and they would be spaced on 80-foot centers. A 200-foot barrier pillar would be left on both sides of the main entries to provide stability and to protect the main entry system from caving. A 300-foot-wide wide pillar would be left in place along the outcrop for bench rim and canyon wall protection.

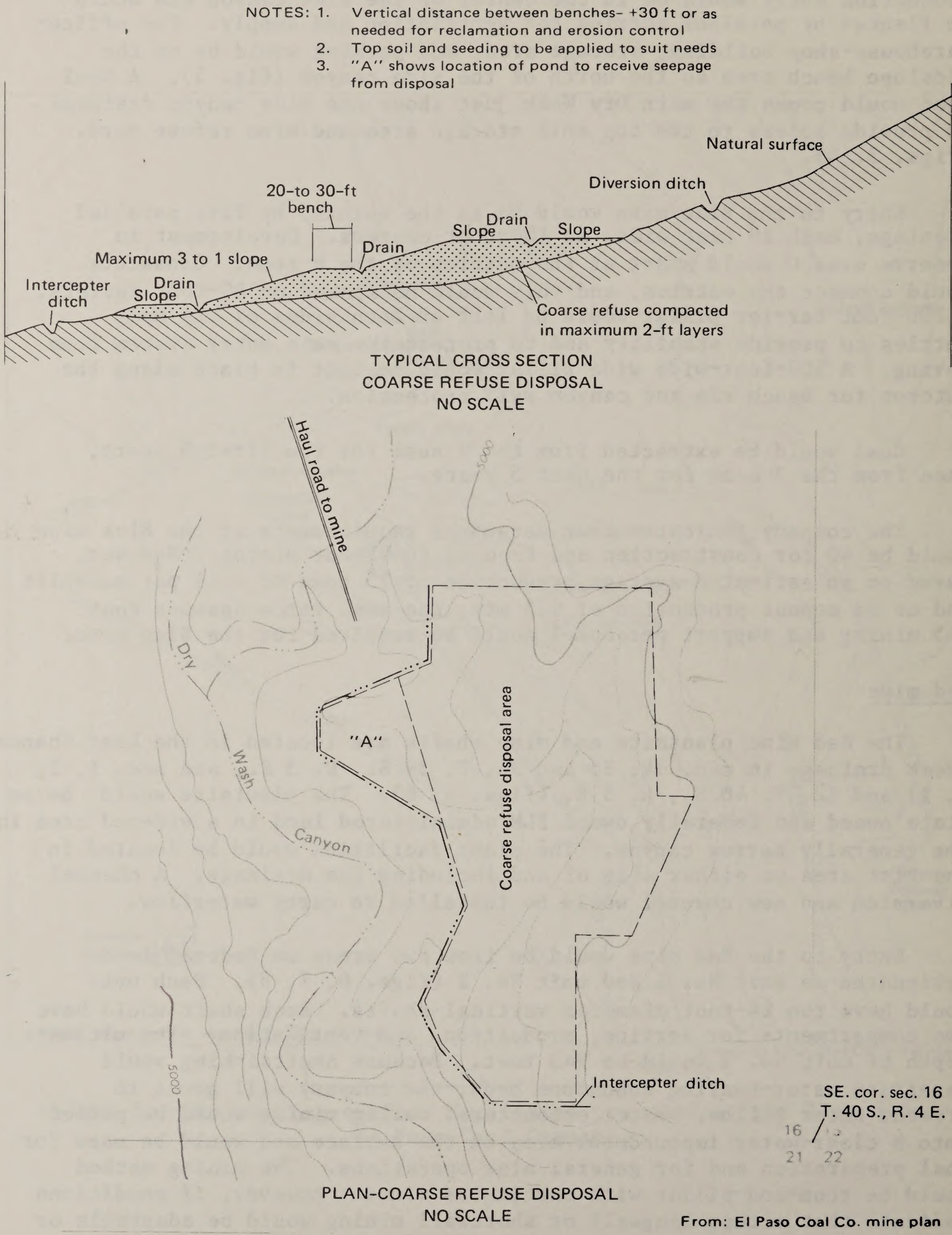
Coal would be extracted from the H seam for the first 5 years, then from the J seam for the next 5 years.

The company indicates that personnel requirements at the Blue mine would be 40 for construction and from 41 to 85 for mining. However, based on an estimated average production of 15 tons of coal per manshift and on an annual production of 0.5 mty, the task force assumes that 145 mining and support personnel would be required for the Blue mine.

Red mine

The Red mine plantsite and mine shafts are located in the Last Chance Creek drainage in sec. 34, 35 and 36, T. 39 S., R. 3 E., and sec. 1, 2, 3, 11 and 12, T. 40 S., R. 3 E. (figs. 5, 6). The plantsite would be on State owned and federally owned BLM administered land in a widened area in the generally narrow canyon. The plant facilities would be located in the flat area on either side of and including the drainage. A channel diversion and new channel would be installed to carry waterflow.

Entry to the Red mine would be from two areas on Federal land designated as unit No. 1 and unit No. 2 (figs. 6, 7, 8). Each unit would have two 24-foot diameter vertical shafts. Each shaft would have two compartments for service, production, and ventilation. The ultimate depth of unit No. 2 would be 943 feet. Because shaftsinking would penetrate water-bearing sandstone beds, the company will grout to prevent water inflow. Water encountered during mining would be pumped into a clear-water impoundment area on the surface and would be used for coal preparation and for general mine operations. The mining method would be room-and-pillar with continuous miners; however, if conditions indicate that either longwall or shortwall mining would be adaptable or more economical, either or both methods would be used. Underground mining facilities would include a maintenance shop, warehouse, and a bulk "rock dust" (limestone) storage facility. The "rock dust" would be transported by pipes from surface tanks.



NOTES: 1. Vertical distance between benches- +30 ft or as needed for reclamation and erosion control
2. Top soil and seeding to be applied to suit needs
3. "A" shows location of pond to receive seepage from disposal

TYPICAL CROSS SECTION
COARSE REFUSE DISPOSAL
NO SCALE

PLAN-COARSE REFUSE DISPOSAL
NO SCALE

From: El Paso Coal Co. mine plan

FIGURE 4.--Plan and cross-section sketch of proposed Blue mine refuse disposal.

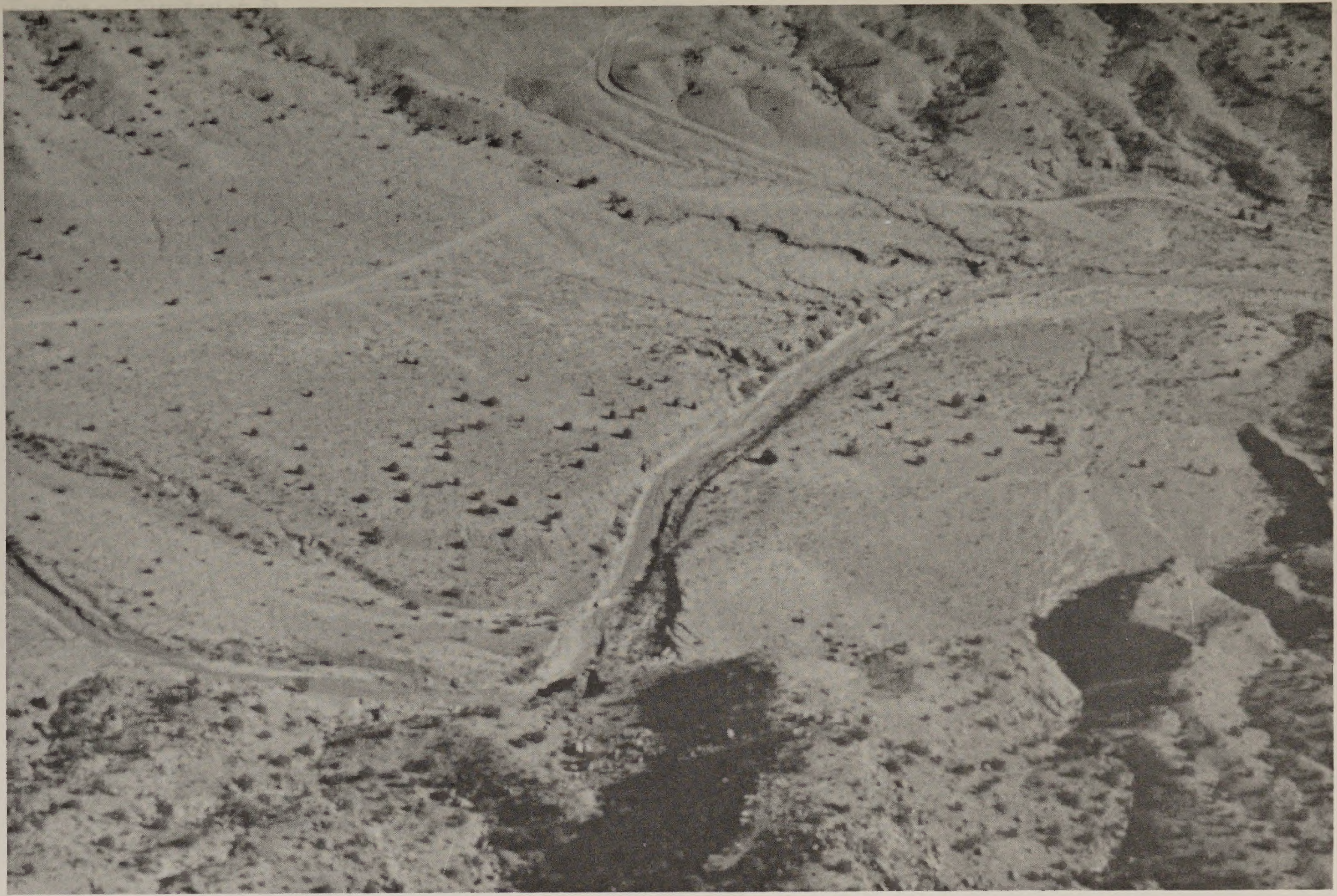
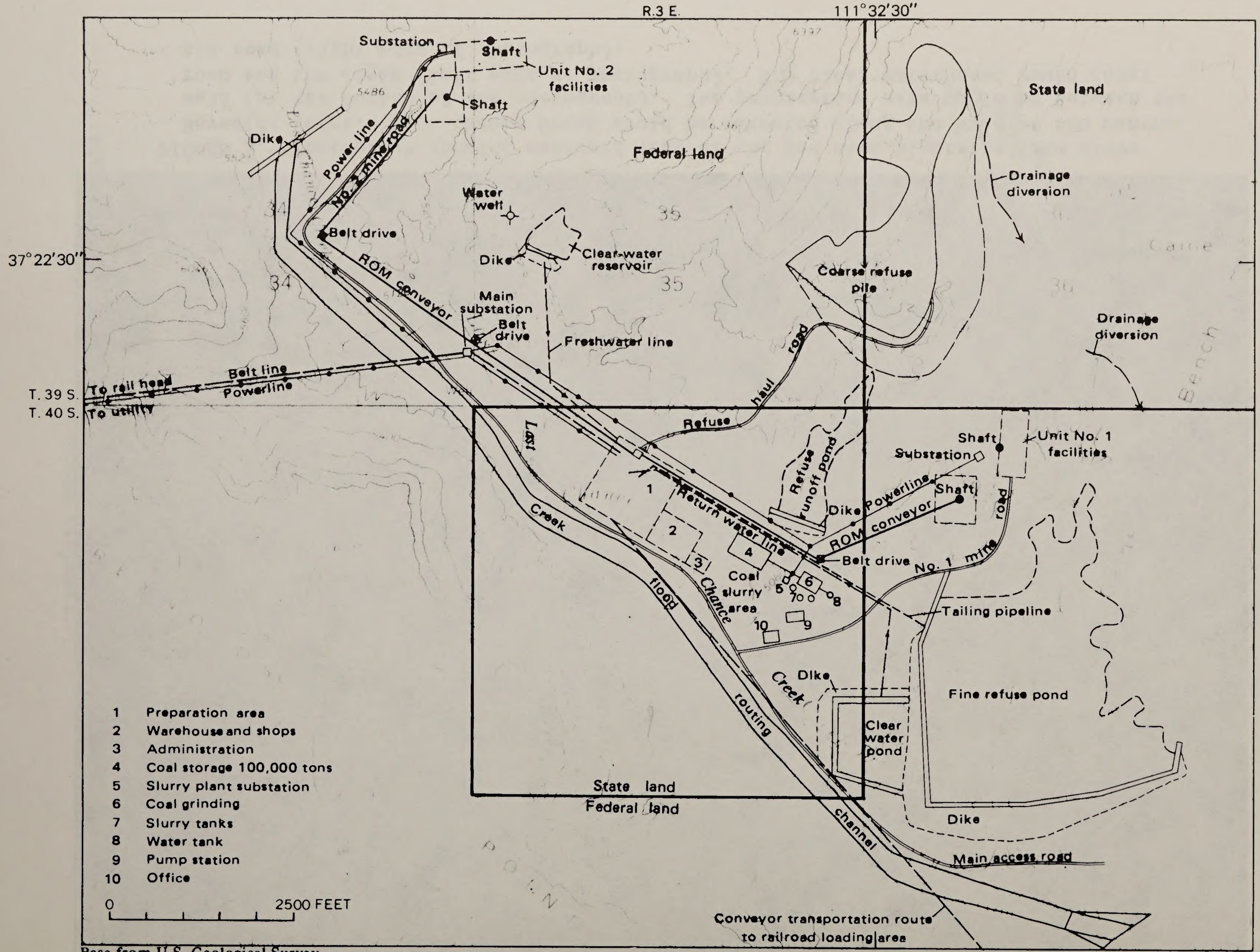


FIGURE 5.--Photograph showing eastward view of the Red mine plantsite from above Reynolds Point. Last Chance Creek would be rerouted along the base of the canyon wall (at the bottom of the photograph). The preparation area would be between the road and the creek (left edge of photograph). The clear-water pond would cover the road (right edge of photograph).



Base from U.S. Geological Survey
Petes Cove and Ship Mountain Point
1:24,000, 1968

FIGURE 6.--Map showing surface facilities proposed at the Red mine, El Paso Coal Company.

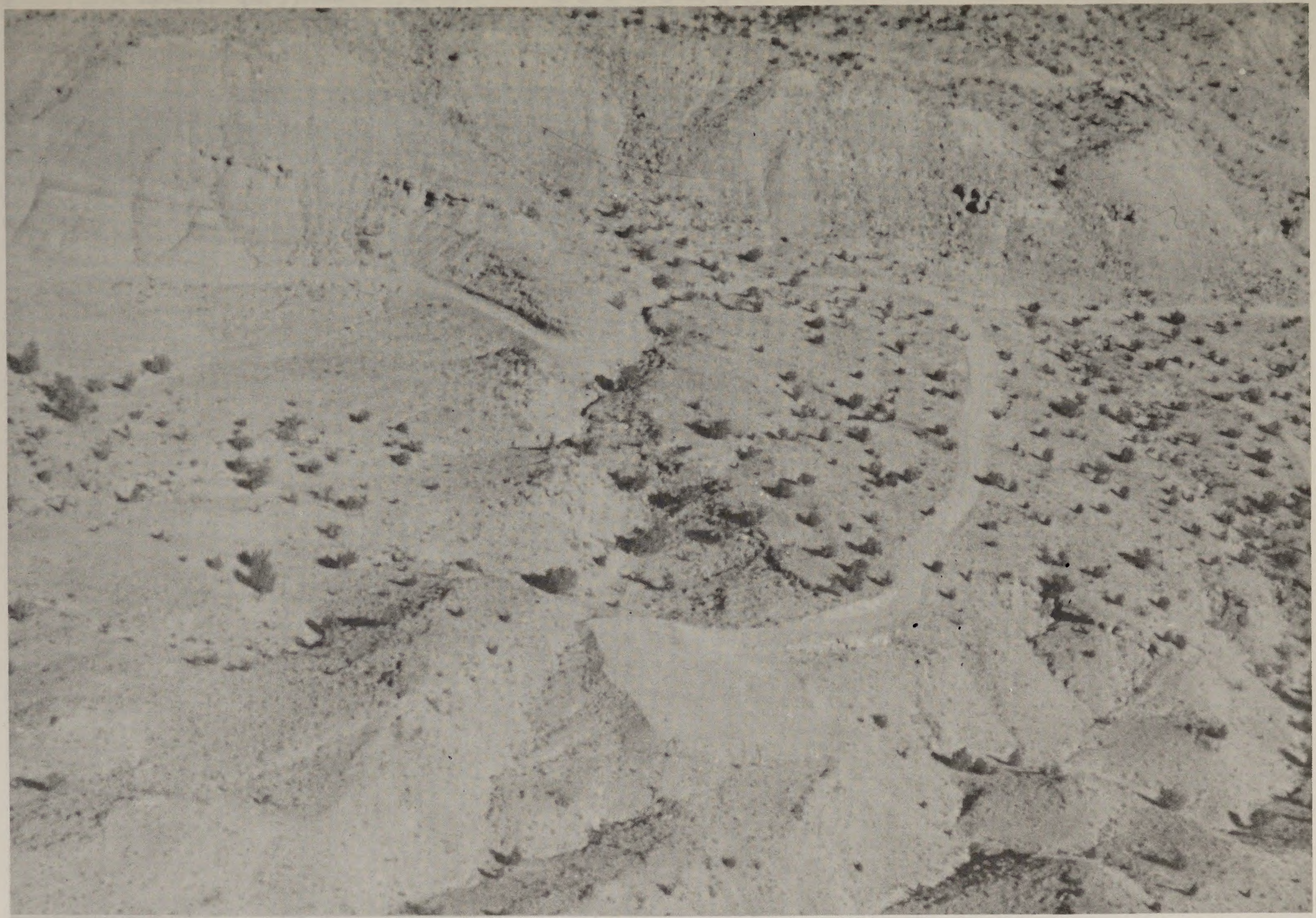


FIGURE 7.--Photograph showing northeastward view of Red mine unit No. 1 shaftsite. The 25-foot circular mine shaft would be on the road to the drill pad (bottom of photograph).

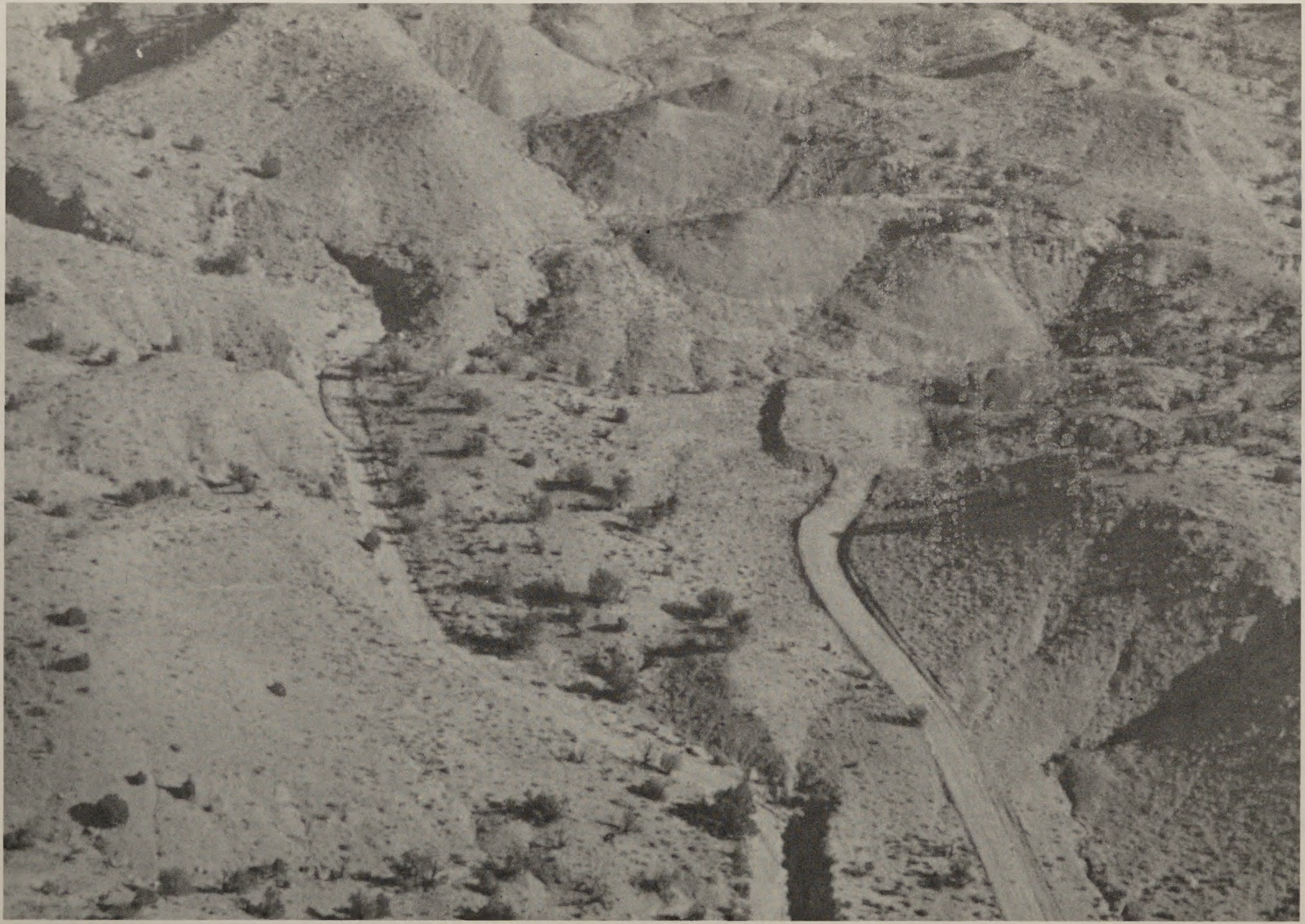


FIGURE 8.--Photograph showing eastward view of Red mine unit No. 2 shaftsite. The 25-foot circular mine shaft would be below and to the left of the 50-foot square drill pad.

Coal from the Red mine would initially be extracted from the H, J, and K-2 seams. When the reserves from these three seams are exhausted, coal would be removed from the lower seams. Refuse from mining would be disposed north and south of unit No. 1 (fig. 6) and distributed as shown in figure 9.

The company indicated manpower requirements during the construction phase would range from 150 to 450 and during the mining phase from 168 to 1,176. However, based on a production rate of 15 tons of coal per manshift, 230 manshifts per year, and an annual production of 6.3 mty, the task force assumes that the probable mining personnel requirement for the Red mine would be 1,825.

Associated preliminary proposals

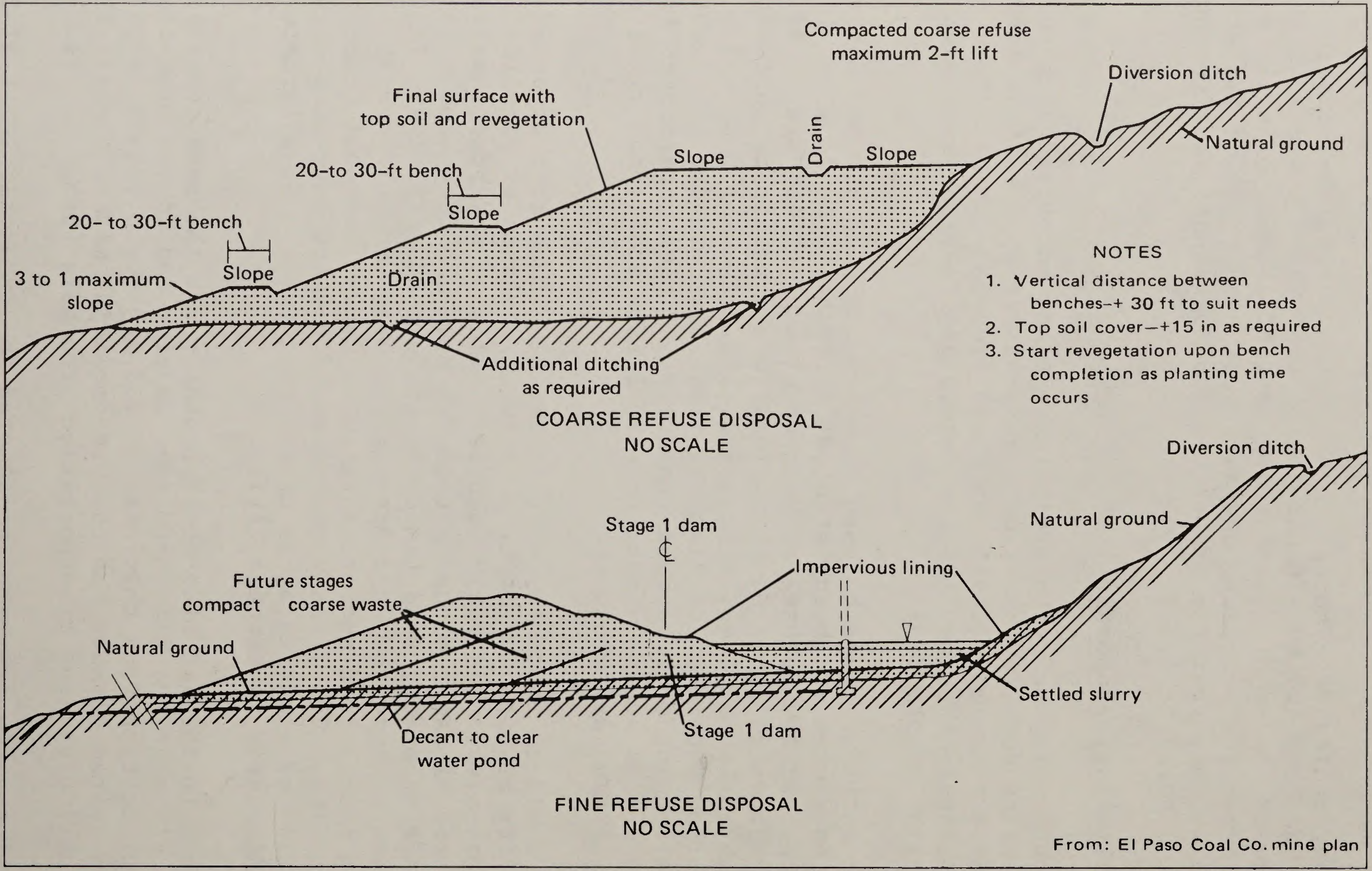
The following proposals are preliminary plans submitted with the mining plans and no detailed plans or rights-of-way applications have been filed. No action is requested on these proposals at this time and an environmental assessment of any future applications will have to be completed prior to approval.

One power corridor would be used to serve the Blue and Red mines. Two transmission routes are being studied: alternative A, 25 miles long, would originate near the Garkane or Utah Power & Light line in T. 38 S., R. 1 E.; alternative B, about 35 miles long, would originate northwest of the Glen Canyon Dam at Page, Ariz. (fig. 10). About 130 to 455 acres would be disturbed dependent on final routing, size of line and right-of-way widths. Alinement of telephone lines has not been determined; lines probably would follow access roads, require little additional right-of-way, and cause little land disturbance.

The coal would be truck hauled from the Blue mine to a proposed transfer facility at Glen Canyon City, a total distance of 30-miles. The proposed primary routes would require 6 miles of new road construction from the proposed minesite along part of Dry Wash and then west to a Kane County low-grade secondary road (Smoky Mountain road, fig. 10). The primary route would then utilize the Warm Springs (Missing Canyon) variant of the Smoky Mountain county road and cross the Glen Canyon National Recreation Area to Glen Canyon City. The primary routes would require extensive upgrading or reconstruction of about 24 miles of existing roads. An alternate route (fig. 10) is discussed in chapter VIII.

Road access to the Red mine would probably use the same route as the Blue mine although the alternate road is proposed in the mine plan. The proposed production from this mine of 6.3 mty would require a major transportation system to move the coal to potential market areas. The company is studying various transportation proposals (table 1; fig. 12).

Three rail systems are being considered in conjunction with El Paso, with coal being moved from the mine to the rail terminus by conveyor.

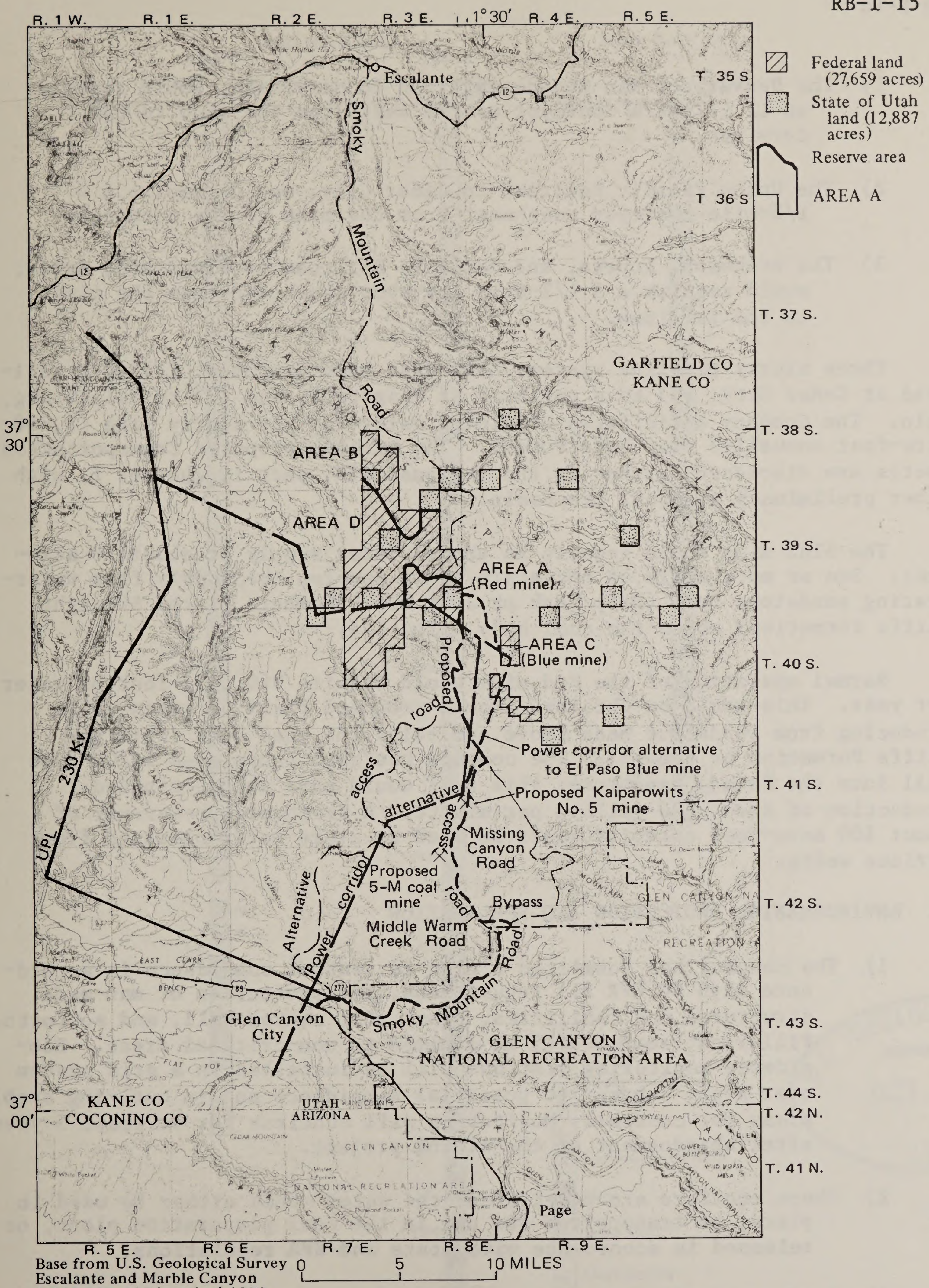


NOTES

1. Vertical distance between benches-+ 30 ft to suit needs
2. Top soil cover—+15 in as required
3. Start revegetation upon bench completion as planting time occurs

From: El Paso Coal Co. mine plan

FIGURE 9.--Cross-section sketches showing proposed Red mine refuse disposal.



Base from U.S. Geological Survey
Escalante and Marble Canyon
1:250,000, 1956, revised 1970

FIGURE 10.--Map showing existing and proposed power-transmission lines and proposed access roads to the Blue and Red mines, El Paso Coal Company.

1) The Denver and Rio Grande railroad to Marysvale, would require an 11 1/2-mile conveyor system west from the mine to the terminus.

2) The Union Pacific Railroad to Cedar City, would require a 5 1/2-mile conveyor southeast from the mine to the terminus.

3) The Atcheson, Topeka, and Santa Fe Railroad to Flagstaff, Ariz., would require a 5 1/2-mile conveyor southeast from the mine to the terminus.

Three slurry pipeline systems have also been proposed: (1) to a railhead at Cedar City, (2) to a railhead at Flagstaff, and (3) to Walsenburg, Colo. The Company anticipates obtaining water for any slurry line (3,680 acre-feet annually) from Lake Powell. The various proposed transportation routes are discussed further in the regional EIS, part 1, chapter I, with other preliminary regional proposals.

The Blue mine would require an annual water supply of about 10 acre-feet. One or more wells as necessary would develop the supply from water-bearing sandstone beds (Drip Tank or John Henry Members of the Straight Cliffs Formation) above the coal beds (fig. 11).

Normal operation of the Red mine would require 960 acre-feet of water per year. This would be obtained from a proposed field of seven wells producing from sandstone beds above and below the coal beds (Straight Cliffs Formation or deeper). The company has also proposed a 5,700-foot well into the Navajo Sandstone; this well would have an anticipated production of about 800 gallons per minute. A freshwater reservoir of about 100 acre-feet capacity would be used to store water obtained from various wells.

C. ENVIRONMENTAL PROTECTION AND RECLAMATION

1) The company has submitted a plan to control subsidence in accordance with 30 CFR 211 regulations, for protection of man-made structures and facilities, bench rim, canyon wall, and so forth. Pillar extraction will be limited to non-critical areas. Subsidence monitoring stations will be installed in a grid system over areas subject to potential subsidence and in outlying stable areas for control. Monitoring will continue for at least 5 years after abandonment of the mining project.

2) Where aquifers are penetrated, the water would either be used in place, be transported for use in the coal preparation plant, or released in accordance with State and EPA regulations.

3) Surface runoff from the coal-preparation areas would be contained and transported to the refuse-disposal runoff pond. Runoff in the area outside the coal preparation areas would be controlled by small retention dams, which would be designed for a 100-year flood.

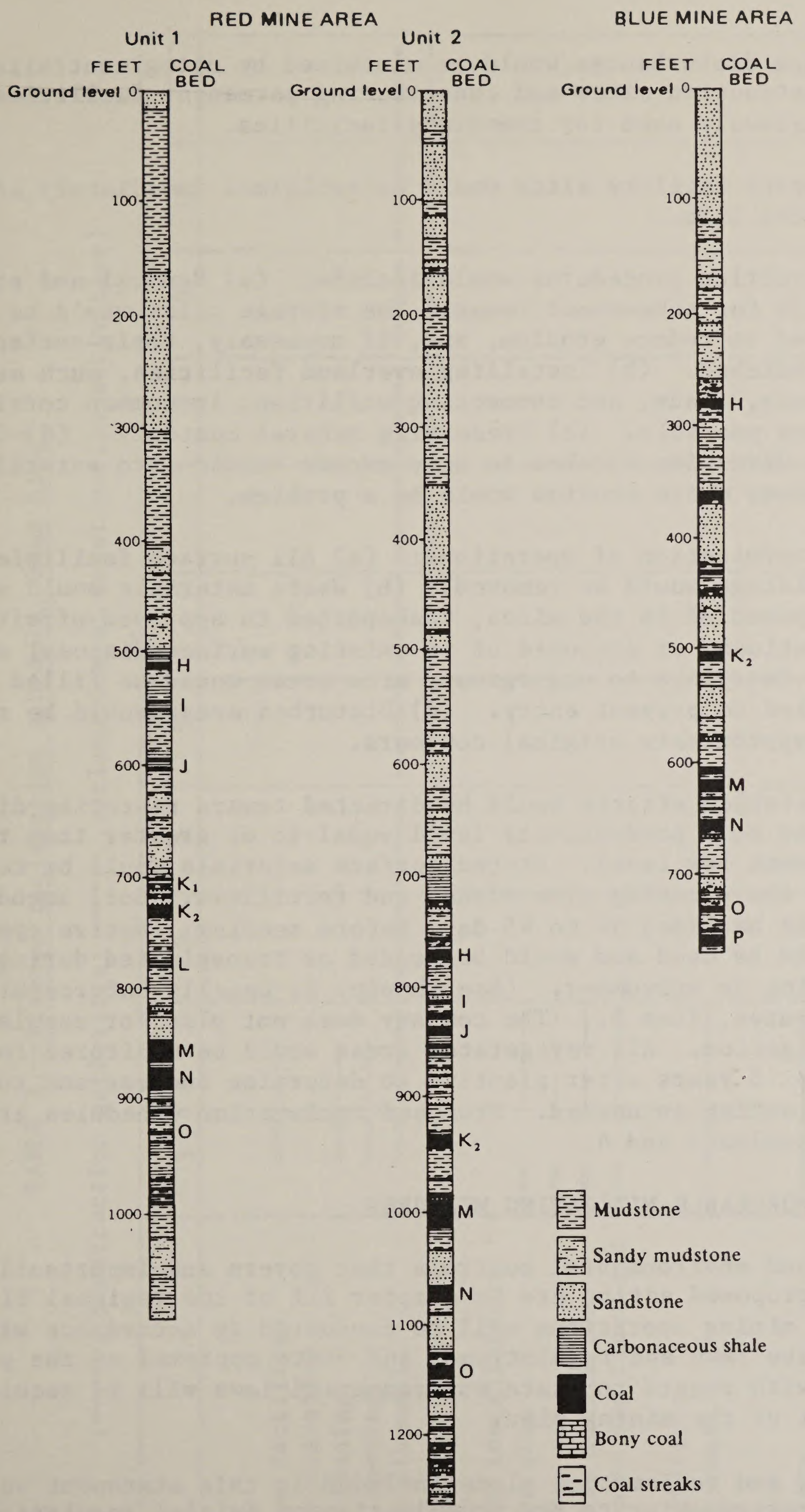


FIGURE 11.--Columnar sections, vicinity of the Red mine, units 1 and 2, and from the general area of the Blue mine.

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4) Surface disturbances would be minimized by using centralized construction sites and constructing permanent facilities in areas previously used for temporary facilities.

5) Temporary facility sites would be reclaimed immediately after their useful life.

6) Construction procedures would include: (a) Removal and storage of soils for subsequent reuse. The storage piles would be revegetated to reduce erosion, and, if necessary, their surfaces would be mulched. (b) Installing overland facilities, such as conveyors, roads, and connecting utilities, in common corridors where possible. (c) Preserving natural contours. (d) Construct ing diversion ditches to move excess runoff into natural drainage courses where erosion would be a problem.

7) Upon termination of operations: (a) All surface facilities and buildings would be removed. (b) Waste materials would either be disposed of in the mines, transported to approved offsite locations, or disposed of in existing surface disposal sites. (c) Entryways to underground mine areas would be filled and sealed to prevent entry. (d) Disturbed areas would be returned to approximate original contours.

8) Revegetation efforts would be directed toward restoring disturbed areas to a productivity level equal to or greater than the present low level. Stored surface materials would be replaced, and the planting site disked and fertilized. Soil amendments would be added 30 to 45 days before seeding. Native species only would be used and would be seeded or transplanted during early spring or midsummer. (See chapter I, Legally Enforceable Mitigating Measures, item 8.) The company does not plan for supplemental irrigation. All revegetated areas would be monitored for at least 5 years after planting to determine success and to assure replanting as needed. Proposed reclamation schedules are given in tables 3 and 4.

D. LEGALLY ENFORCEABLE MITIGATING MEASURES

Planning and environmental controls that govern and importantly relate to the proposed action are in chapter III of the regional EIS part 1. Total mining operations will be conducted in accordance with Federal and State laws and regulations, and State approval of the proposed actions with regard to State environmental laws will be required before approval of the mining plan.

The mining and reclamation plans included in this statement were submitted for review prior to the promulgation of initial regulations (30 CFR 700) required under Section 502 and 523 of the Surface Mining Control and Reclamation Act (SMCRA) of 1977 (P.L. 95-87) and have not been officially reviewed for compliance therewith. Therefore, the mining

TABLE 3.--Planned reclamation schedule, Blue mine[1]

[=====, construction activities; -----, reclamation of construction activities]

	Project years										
	1	2	3	4	5	6	7	8	9	10	11
Activity:											
Surface facilities	===	----									
Coal preparation and loading	===	----									
Entry opening	===	----									
Refuse disposal	===	======	======	======	======	======	======	======	======	======	======
			------	------	------	------	------	------	------	------	------
Temporary installation:											
Trailer site	===	------									
Office	===	------									
Sanitary facilities	===	------									
Warehouse and first aid	===	------									
Transportation:											
Access road	======	------									
Utilities:											
Powerline	======	------									
Potable water system	===	------									

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[1] Note: Areas used for life-of-mine activities will be reclaimed as discussed in the mining and reclamation plan and monitored for a minimum of 5 years.

TABLE 4.--Planned reclamation schedule, Red mine[1]

[=====, construction activities; -----, reclamation of construction activities]

Activity	Project years								
	1	2	3	4	5	7	8	9-38	39
Construction of facilities:									
Unit 1 shaft facilities	======	======		------					
Unit 2 shaft facilities		======	======	------					
Central facilities	======	======	======	------					
Access roads	======	======	------						
Coal preparation:									
Preparation plant	======	======	======	------					
Raw and clean coal storage			======	------					
Dry refuse disposal			======	------					
Wet refuse disposal			======	======	======	======	======	======	======
			------	------	------	------	------	------	------
Fresh water system			======	======	======	======	======	======	======
			------	------	------	------	------	------	------
Shaft sinking and equipping:									
Unit 1 shafts	======	======	======	------					
Unit 2 shafts		======	======	======	------				
Temporary installation:									
Construction, offices	===				------				
Warehouse, sanitary and emergency facilities	===				------				
Trailer sites	===				------				
Access roads	===				------				
Transportation:									
Connecting conveyors			======	======	------				
Clean coal conveyor		======	======	------					
Utilities:									
Powerline	======	------							
Potable water	======	======	------						

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[1] Note: Areas used for life-of-mine activities will be reclaimed as discussed in the mining and reclamation plan and monitored for a minimum of 5 years.

and reclamation plans may not reflect the requirements of the initial regulations. However, in this statement the applicable initial regulations are considered as a required Federal mitigating measure. The operator has been requested to revise the mining and reclamation plans in accordance with the applicable initial regulations. As soon as the mining and reclamation plans are revised they are to be submitted to the Office of Surface Mining Reclamation and Enforcement (OSM) to determine compliance with the requirements of Federal regulations at 30 CFR 211 and 30 CFR 700. The mining and reclamation plans cannot be approved until they conform to all applicable requirements.

1) The proposed developments fall under the provisions of the Surface Mining Control and Reclamation Act of December 13, 1977 (P.L. 95-87). The act was not in existence at the time the mining plans were submitted, but all applicable regulations of Surface Mining and Enforcement program (30 CFR, Part 700) will apply to development of the Blue and Red mines and their supporting facilities.

2) A paleontological survey shall be undertaken before mining activities begin, and all provisions of the State Antiquities Act (HB 366, 1977) shall be complied with. In the event that paleontological resources are discovered on federally owned lands, proper Federal authorities shall be notified and their recommendations followed.

3) One additional hydrologic monitoring station will be installed in addition to the station network that is a part of the mining and reclamation plan. This is to be established on Last Chance Creek, just downstream from Dry Wash (fig. 1). The company will provide substitute water supplies to replace springs and streams depleted as a result of mining, as required by the State of Utah (Title 73-3-23) or the State Office of Surface Mining Reclamation and Enforcement.

4) Refuse disposal ponds will be lined with a material of low hydraulic conductivity to prevent seepage into ground-water bodies.

5) The refuse disposal ponds or areas where toxic or potentially dangerous materials are disposed will be fenced or covered to prevent access by livestock, waterfowl, shore birds and terrestrial wildlife.

6) Ground-water withdrawal will be scheduled and controlled to minimize the anticipated large drawdowns of ground-water levels. Pumping some water from the Navajo Sandstone from separate wells will reduce the effects on water-bearing beds in the Straight Cliffs formation.

7) Revegetated tracts of disturbed land will be fenced to prevent grazing by livestock until the vegetation is reestablished, as determined by proper State or Federal authority.

8) Irrigation to reestablish vegetation may be required, seeded species may be other than native but will be suitable for the area as determined by the land management agency in charge.

9) The operator shall employ the best management practices to reduce fugitive dust regardless of predicted concentrations during operations. Thus the mining plan and the Department's approval thereof will use an appropriate combination of the following fugitive dust controls:

    a) Pavement or equivalent stabilization of all haul roads used or in place for more than one year.

    b) Treatment with semi-permanent dust suppressant of all haul roads used or in place for less than one year and for more than two months.

    c) Watering of all other roads in advance of and during use whenever sufficient unstabilized material is present to cause excessive fugitive dust.

    d) Reduction of fugitive dust at all coal dump (truck to crusher) locations through use of negative pressure bag house or equivalent methods. Inclusion of conveyor and transfer point covering and spraying and the use of coal loadout silos.

10) Fencing will be done using fences approved for wildlife areas as prescribed by the appropriate State or Federal authority.

11) A detailed survey to identify threatened and endangered plant species will be made before any land-disturbing activities are permitted in the minesite or related areas. Any such plants and their habitat will be protected from any negative impacts related to mining.

12) The Red and Blue mines proponents and the appropriate Federal authorizing office will comply with Section 106 of the National Historic Preservation Act of 1966 (16 USC Section 470f, as amended, 90 Stat. 1320) and the Advisory Council's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800) prior to approval of any undertaking which will affect cultural properties included in or eligible for inclusion in the National Register of Historic Places.

13) A detailed soil survey will be conducted by a qualified soil scientist to aid in preparation of the final site development plans and the reclamation plans.

The Bureau of Land Mangement, Utah State Director, and the Utah State Historic Preservation Officer have entered into a memorandum of understanding which sets forth measures the Bureau would undertake in regard to the protection of cultural resources on public lands. The principal point in the agreement is that the project proponents will be required to have an intensive survey made for all areas that will be disturbed. If any sites are found to be of National Register significance, the project would either have to be altered so as to avoid the site(s) or provide for the preservation of data from the site(s). A cooperative agreement having the same effect exists between the USGS and BLM for "Protection of Cultural Resources related to Onshore Mineral Lease Operations exclusive of Oil, Gas, Geothermal, and Oil Shale" leases.

CHAPTER II

DESCRIPTION OF THE EXISTING ENVIRONMENT

A. NATURAL ENVIRONMENT

1. Climate

The climate of the region is described in the regional EIS, part 1, chapter II. Average monthly temperatures at the minesites range from about 30°F in January to about 70°F in July and August. Temperature extremes are typically below 0°F and above 100°F. Precipitation averages 12 inches per year, with 4 inches distributed during May-September, and potential evaporation may be as much as 70 inches per year. Winter storms may deposit a foot or more of snow, and snow cover may last up to a month. Summer thunderstorms often produce intense rainfall. The 100-year 6-hour precipitation is 2.4 inches.

2. Land

a. Land surface

The project area is one of plateaus--benches at the 6,000foot level and ridges at the 7,000-foot level--that are dissected by precipitous deep canyons. The canyon floors are at the 5,000-foot level. Relief is between 600 and 2,000 feet.

b. Geology and minerals

The potential for regional geologic hazards is discussed in the regional EIS, Part 1, chapter II; although applicable to the El Paso mine areas, the probability of impact is not site specific to the El Paso mines.

Outcropping rocks strike NW and dip 1° to 3° SW. They consist of the Wahweap Formation, a sequence of sandstone and mudstone, and the underlying Straight Cliffs Formation. Both formations have been assigned to the Upper Cretaceous. The underlying Upper Cretaceous Tropic Shale crops out near the base of the Kaiparowits Plateau.

Coal beds in the John Henry Member of the Straight Cliffs formation range in thickness from less than 1 foot to 23 feet. Beds of bituminous coal less than 4 feet thick are not currently considered economic. Geologic conditions during coal deposition resulted in seam splits, shale partings, pinchouts, and considerable thickening and thinning of individual coal beds. Coal seams have been assigned informal letter designations G through O, with the K seam subdivided into K_1 and K_2 (fig. 11).

Coal from the Kaiparowits Plateau ranges in quality from subbituminous C to high-volatile A bituminous; most of it is high-volatile C bituminous.

The ash content is moderate, and the sulfur content, as mined, is low (Doelling and Graham, 1972, p. 93). The coal is noncoking; it may require cleaning before use for power generation. Coal analyses for the Red and Blue mines are summarized in tables 5 and 6.

TABLE 5.--Coal analysis ranges, reserve area A, Red mine, Kane County, Utah

Proximate, as received (percent)		Ultimate, as received (percent)	
Moisture-------	6.37- 8.31	Moisture-------	6.37- 8.31
Ash------------	6.22-13.31	Carbon---------	61.52-67.77
Volatile-------	37.77-40.51	Hydrogen-------	4.62- 4.98
Fixed carbon---	42.52-46.78	Nitrogen-------	.98- 1.17
Sulfur---------	.42- .83	Chlorine-------	.00- .03
		Sulfur---------	.42- .83
		Ash------------	6.22-13.31
Btu/lb---------	11,115-11,973	Oxygen---------	11.56-12.36

TABLE 6.--Coal analysis ranges, reserve area C, Blue mine, Kane County, Utah

Proximate, as received (percent)		Ultimate, as received (percent)	
Moisture-------	7.04- 9.25	Moisture-------	7.04- 9.25
Ash------------	4.34-12.71	Carbon---------	61.13-68.45
Volatile-------	37.53-40.72	Hydrogen-------	4.59- 4.88
Fixed carbon---	41.09-47.45	Nitrogen-------	0.92- 1.25
Sulfur---------	0.38- 1.23	Chlorine-------	0.00- 0.04
		Sulfur---------	0.38- 1.23
		Ash------------	4.34-12.71
Btu/lb---------	10,735-12,023	Oxygen---------	10.73-11.95

Little is known about the paleontologic resources in the area of the Blue and Red minesites. Paleontologic resources found on Nipple and Fourmile Benches are discussed in part 1, chapter II.

c. Soils

The general setting of the proposed mine area is in a "rockland" unit identified as number 68 (Wilson and others, 1975) and described in part 1. The Blue mine facilities would be located on a lower canyon slope and narrow valley bottom (fig. 3). The valley is surrounded by steep rocky canyon walls, above which are sandstone plateaus with shallow soils. The soils range from stony sandy loam to clay loam, with depths estimated at 1 to 5 feet. Soil productivity is limited primarily by low precipitation. The potential for erosion by wind and water is low to moderate.

Soils at the Red mine facilities site (fig. 6) have formed from waterlaid sediments on the bottomlands and terraces adjacent to Last Chance Creek, and from shale and fine-grained sandstone on the nearby rolling to steeply sloping uplands.

Most of the mine facilities would be constructed on gentle slopes, where well-drained deep silt loam to gravelly alluvial soils are present. Soil productivity is limited somewhat by lack of moisture.

Above the bottomlands, the soils are formed from shale and fine-grained sandstone on canyon benches. These soils are where the mine shafts, refuse pile, and refuse ponds would be located. At lower elevations, the soils dominantly are clayey and overlie shale; at higher elevations they are sandy and overlie sandstone. The soils on shale are silty to clayey, high in soluble salts, and very erodible by water and moderately erodible by wind. The sandstone soils are sandy to loamy and are low to moderately erodible by water and moderately to highly erodible by wind. Benchland soils are generally thin but may be as much as about 4 feet thick. They are well drained to excessively drained.

Probable annual success in reseeding disturbed areas, under otherwise natural conditions, is less than 3 years in 10 for soils on shale and thin sandstone soils. Probable success is 3 to 5 years out of 10 on alluvial soils (Hagihara and others, 1972).

The utility lines and roads would cross a variety of soil areas, including steep rocky lands; benches with both sandy and clayey soils; narrow bottomlands along drainageways; and rocky, colluvial toeslopes. The conveyor going west from the Red mine would ascend over steep slopes with shallow rocky soils.

3. Water

Water on or near the lease area is extremely scanty during most of the year. The few very small springs or seeps supply water for wildlife, livestock, and occasionally for nonpotable human uses. The number and flow of springs varies with the season and climatic conditions. Some springs may go dry at times, and the distance between streambottom water holes may range from 2 to more than 5 miles during dry seasons.

The proposed mines are in the Last Chance Creek watershed, which drains to Lake Powell, about 20 miles away. The streams are mostly ephemeral, and flow is significant only in response to rainfall or snowmelt. The Blue mine is in Dry Wash, an appropriately named tributary to Last Chance Creek. The Red mine and the main surface facilities are near Last Chance Creek. Springs sustain small flows for short distances along the channel part of the time. The Red mine would underlie about 10 square miles of the Last Chance Creek watershed, including a 3-mile reach of Last Chance Creek. The drainage area of Last Chance Creek upstream from the minesite is about 100 square miles, and the average annual runoff is estimated at 640 acre-feet.

Ground water in sandstone beds is discontinuous and drained near cliff faces because the drainage in the lease area is deeply incised in exposed bedrock. Data are insufficient to determine local direction of ground-water flow but regional flow is southward and south-eastward. Ground water may be perched, or impeded from deeper infiltration, by one or more layers of rock having relatively low permeability. One or more perched ground-water bodies may occur above or within the coal beds. Water yields are small to moderate (5-500 gal/min) from sandstone and limestone to large (50-1500 gal/min) from very thick sandstone. In the region the quantity and chemical quality of ground water available to individual wells will vary with depth, formation, and location (regional EIS, part 1, chapter II).

Water-bearing beds near the surface are recharged by precipitation in the vicinity, possibly as much as 30 acre-feet per year per square mile of recharge area. Data are scant, but indications are that deeper units are recharged by underflow from some distance away, probably from the northwest.

The most extensive and productive aquifer is the Navajo Sandstone. The Navajo lies at depths of 2,000 to 4,000 feet beneath Fourmile and Nipple Benches (fig. 1) but is shallower in parts of the lease area. Farther south, in the lower Wahweap Creek area, the formation is exposed or just below the surface. Yields there reportedly range from several hundred to more than 1,000 gal/min (BLM, 1976, p. II-139).

The Drip Tank Sandstone Member and the underlying coal-bearing John Henry Member of the Straight Cliffs Formation will yield water to wells. These members crop out and are near the surface in the lease area, but yields to wells are expected to be less than 150 gal/min. Yields from water-bearing beds in overlying Wahweap Formation are smaller.

The chemical quality of water in Last Chance Creek deteriorates downstream through the Red mine area. A sample taken upstream from the lease area contained 1,440 mg/L dissolved solids and 825 mg/L sulfate; a sample taken downstream contained 2,920 mg/L dissolved solids and 1,840 mg/L sulfate. Neither sample met the recommended EPA standards for human consumption, but both would be suitable for livestock and wildlife. Concentrations of heavy metals and trace elements such as cadmium, lead, manganese, and selenium may exceed recommended limits for public supply (EPA, 1973), according to recent unpublished data collected under the 208 Water Quality Project for the Five-County Area.

Sediment loads in Last Chance Creek are moderate to high during high flows because of the relatively steep slopes and available erodible materials.

4. Air

Particulates would be the major pollutant and are discussed in relation to El Paso Red and Blue mines. Other pollutants such as sulfur dioxide, nitrogen oxides, carbon monoxide, and photochemical oxidants would be negligible (AeroVironment, 1977). National ambient air quality standards for particulates are given in regional EIS, part 1, table III-1.

Monitoring of total suspended particulates (TSP) in the area is relatively extensive compared to that for many other pollutants for which national standards have been promulgated. Measurements have been made around potential and existing power plantsites by private consultants and in other areas by the Environmental Health Services Branch of the Utah Division of Health. Maximum 24-hour concentrations of total suspended particulates at 10 stations range from 70 to 742 $\mu g/m^3$ and the annual average is 26 $\mu g/m^3$ (regional EIS, part 1, table II-7). Although the average annual background TSP concentrations are within the annual ambient air quality standard, the short-term standards were exceeded periodically by particulates being suspended during strong wind conditions. Violations of the primary standard for 24 hours were recorded at three locations and violations of the secondary standard were recorded at five locations.

Median visibilities in non-urban areas of the southwest are 65 to 80 miles, according to work by Trijonis (1978). Measurements at Cedar Mountain, east of Castle Dale and southeast of Price, Utah (part 1, fig. I-1), have monthly averages ranging from 54 miles in April 1977 to 94 miles in November and December, 1976 (Pueschel and others, 1978). Values of visual range have been derived from light-scattering measurements taken near Alton, Utah (part 1, fig I-2), in the period February 1976-June 1977. An Alton, computed average visibility was 56.5 miles and daily averages ranged from 22.4 miles to 86.3 miles (Graham and Hovind, 1977).

5. Vegetation

The leases include three major vegetative types. The Pinyon-Juniper Woodland type covers 77 percent of the Red mine area and all of the Blue mine area. Utah juniper dominates 95 percent of the type, with an occasional pinyon pine. The Desert Shrub type covers 20 percent of the Red mine area. Codominant species are snakeweed and Mormon tea. The smallest area (3 percent of the Red mine area) is covered with the streamside type. Rabbitbrush and tamarix dominate this type. The access roads would be located on all three types. The characteristics and regional extent of vegetative types are described in the regional EIS, part 1, chapter II.

The Endangered Species Act of 1973 requires a study of sensitive plant species. BLM compiled the following list of endangered and threatened plants for the project area:

Endangered species	Threatened species
Viguiera soliceps	Euphorbia nephradenia/Spurge
Astragalus malacoides/Milkvetch	Peteria thompsonae

Welsh (1977) did not locate any of the above plants in his survey of the area.

6. Wildlife and Fisheries

Wildlife on the Kaiparowits Plateau is characterized by diversity but very limited numbers of species. Deer, pronghorn antelope, bighorn sheep, mountain lion, coyote, bobcat, jackrabbits, and fox are the principal large mammals. Over 200 species of birds, 30 species of small mammals, and 32 species of reptiles and amphibians use the plateau (regional EIS, part 1, chapter II; BLM, 1976).

Game species include deer, antelope, bighorn sheep, mountain lion, cottontail rabbit, chukar, and mourning dove.

Mule deer are found in small numbers on the plateau. Range surveys by the Utah Division of Wildlife Resources (UDWR) indicate that the winter range could support more deer, but adequate summer range is the limiting factor (Huff and others, 1965). Isolated groups of deer inhabit some areas of winter range year round. ,The area is included in State deer herd unit 60B (Kaiparowits). There is an average of 100 hunters per year afield on the unit, and the average annual harvest during 1967-76 was 46 deer (John, 1977).

Antelope were reintroduced by UDWR on East Clark Bench during 1970 and 1971. The present population is low, and few animals survive from the initial transplant. Illegal hunting is one factor holding down population. Most of the Kaiparowits Plateau area is unsuitable for antelope due to the extremely broken terrain. It is unlikely they will expand their present range.

Bighorn sheep historically inhabited the area in greater numbers; they are still sighted occasionally.

Mountain lions are generally associated with deer, which are their principal food. The largest population of lions is on Fiftymile Mountain. During 1971-77, three mountain lions were killed in the area by hunters (Fair, 1977).

Cottontail rabbit and mourning dove are found throughout the area, where habitat is suitable. Small populations of chukar are found along the Paria River and Last Chance Creek.

Rocky cliffs and ledges are nesting sites for birds of prey. The golden eagle is a common year-round resident, and the bald eagle is a winter visitor. The peregrine falcon, an endangered species, may use the area during migration. No resident threatened or endangered wildlife species is known in the area of the proposed mine (Boner and others, 1977).

There are no fish on the site of the proposed action. Other aquatic species are extremely sparse due to the absence of perennial water.

B. CULTURAL ENVIRONMENT AND LAND USE

1. Lands

The proposed operations would be entirely on Federal- and State-owned lands. The total area under lease to El Paso Coal Co. is 27,659 acres of public land administered by BLM and 12,887 acres of State land.

Current land use includes grazing, wildlife habitat, and recreation. Kane County zoning ordinances authorize coal mining on the proposed mining area.

The mineral objective of the BLM Management Framework Plan (Paria Planning Unit) is to make coal available on a managed controlled basis consistent with county, State, and Federal planning and the National Environmental Policy Act. The BLM has determined the future intended use of the land to be livestock range, wildlife habitat, watershed, and limited recreation. The State has no definite long-range plans for their lands in the area.

2. Agriculture, Range, and Timber

Cattle graze the entire leased area under permits from BLM and the State. The carrying capacity is considered to be poor, but more grazing pressure shows around the Red mine facilities area because of the closeness to water. Grazing capacity totals approximately 30 AUM's for the Red and Blue mine facility areas, and access roads.

Lack of water restricts use of the range by causing overgrazing near water and no use away from water.

Juniper fenceposts, firewood, and pinyon Christmas trees provide the only direct use of the woodland. This use is rather minor due to the distance to a market.

3. Socioeconomics

The population density of rural southern Utah is 0.3 per square mile and the total population is about 7,000 to 7,500. Communities within this region most likely to be affected by the El Paso mines have economies based essentially on agriculture. A high degree of lifestyle similarity, religious orientation, and community and family stability is characteristic of the communities and families in southern Utah. Other similar nearby communities (fig. I-2) that might be affected are Antimony (current population approximately 113), Cannonville (113), Fredonia, Ariz., (current population approximately 600), and two larger communities within 100 miles--Kanab and Panguitch--with populations of 1,500-1,600 each.

Likely to be affected is Page, Ariz., located about 30 miles south of the proposed mine, with a current estimated population of 4,000.

Average monthly salaries of the civilian labor force in Kane and Garfield Counties are $472 and $567, respectively (Utah Industrial Promotion Division, 1976, p. 4). Many residents are employed in part-time jobs, and many of these jobs are seasonal (particularly agricultural, recreational and tourist oriented jobs). A relatively large, and probably increasing percentage of Kane and Garfield County residents are 45 years old and older. Residents of Page, Ariz., are employed primarily in recreation services, governmental services, in the nearby Navajo Power Plant, or they are retired, thus making the Page population more diversified in lifestyle and religious background.

A recent opinion study in eight Utah communities, but not necessarily in the immediate El Paso mines impact area, obtained data which, because of cultural similarities, illustrate how residents in this subregion perceive their communities (Geertsen and others, 1977). Residents were concerned about economic and population growth possibilities in their communities and indicated that they preferred moderate growth. Community closeness was important to the respondents, and many indicated a willingness to serve on committees, sign petitions, give of their spare time, and so forth, to aid in community betterment. They also indicated that entertainment facilities for youth were in need of being established or improved. Almost 70 percent of the residents considered improved housing to be necessary.

4. Transportation and Utilities

The present regional road system near the Kaiparowits Plateau is described in chapter II of the regional EIS (part 1), and local roads are shown in figure 12. No roads onto or across the plateau will carry more than a few cars per day, and two of these roads might be upgraded for access to the mines (fig. 10). Use of roads on the plateau to serve the Blue, Red, and other nearby proposed mines would require about 30 to 35 miles of upgrading and new road construction (table 1).

No utility lines cross the plateau. Telephone service is available at Escalante and at Glen Canyon City. Electric power is available from Utah Power & Light Company transmission lines about 20 miles west, near Grosvenor Arch, or southwest of Glen Canyon City (fig. 10).

5. Recreation

No recreation use or activities records are kept for the Red or Blue mine areas, but onsite evidence indicates that use is very light.

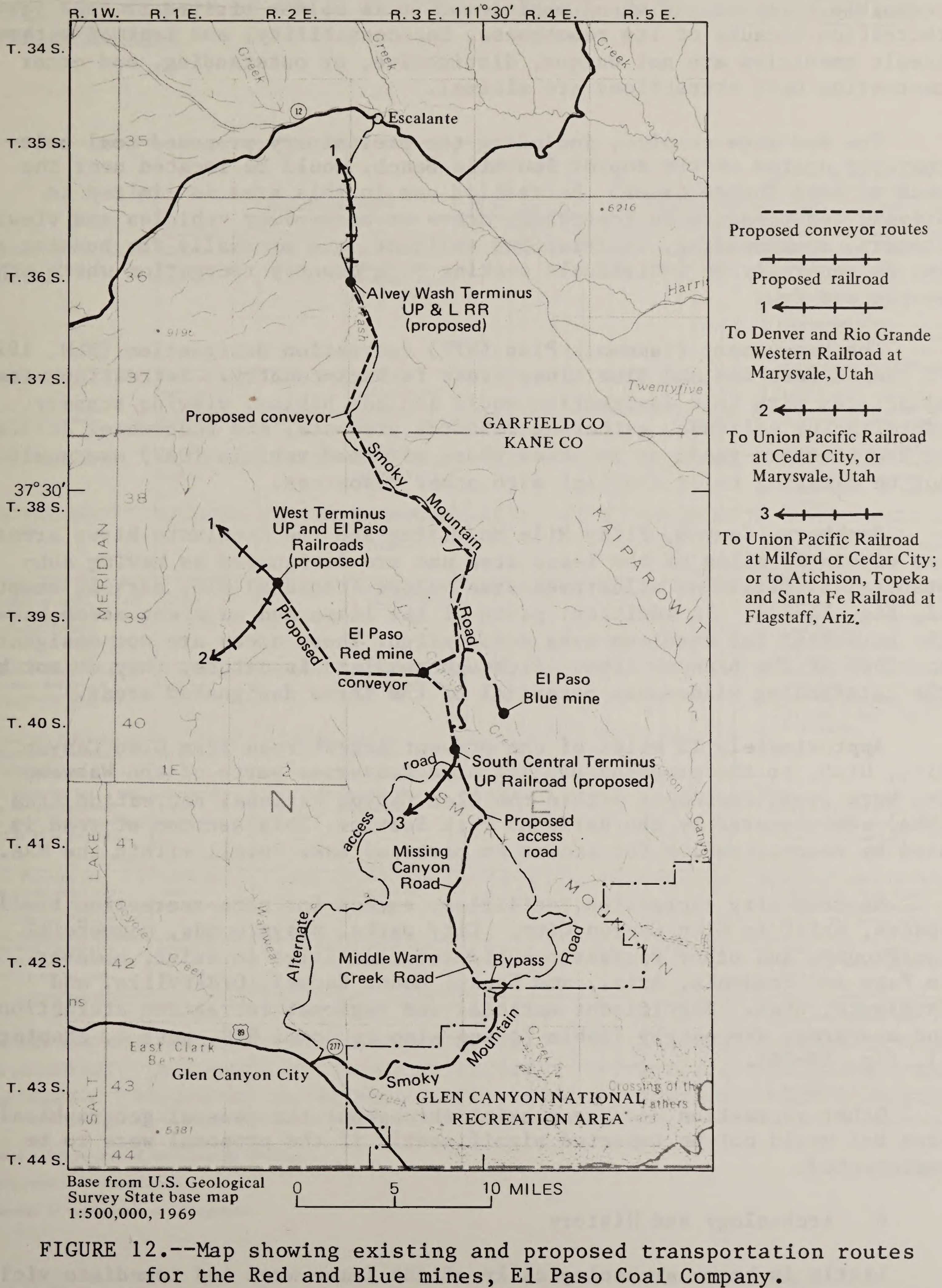

FIGURE 12.--Map showing existing and proposed transportation routes for the Red and Blue mines, El Paso Coal Company.

The proposed site for the Blue mine in Dry Wash is presently inaccessible to motorized wheel vehicles. It is seldom visited or used for recreation because of its remoteness, inaccessibility, and lack of water. Scenic amenities are not unique, distinctive, or outstanding, and other recreation user attractions are minimal.

The Red mine complex, including the preliminary proposed coal belt conveyor system to the top of Fourmile Bench, would be located near the head of Last Chance Creek. Recreation use in this area is limited to driving for pleasure in four-wheel-drive or heavy-duty vehicles and viewing scenery, rockhounding, experiencing solitude, and minimally for hunting game. Use is generally by individuals seeking back-country recreation where other people are few.

The Management Framework Plan (MFP) recreation designation (BLM, 1975) of the El Paso Red and Blue mines areas is back-country. Recreation uses associated with this designation would include hiking, viewing scenery, experiencing solitude, gathering resource products, and four-wheel driving on low-standard roads or in areas where off-road vehicle (ORV) use would not be damaging to or conflict with other resources.

Hackberry Canyon, Fifty Mile Mountain, and the Escalante River areas are within 15 miles of the lease area and are designated as having substantial primitive or wilderness area values (regional EIS, part 1, chapter II, fig. II-21). In addition, parts of the lease and adjacent areas have the potential for roadless area designation. These areas are not designated roadless at the present time. Although roadless in nature, they do not have the outstanding wilderness potential of the three designated areas.

Approximately 12 miles of the present access road from Glen Canyon City, Utah, to the proposed project area traverses parts of the Wahweap and Warm Creek drainages within the Glen Canyon National Recreation Area (NRA) administered by the National Park Service. This section of road is used by recreationists for access to parts of Lake Powell within the NRA.

No community recreation facilities, except for some recreation trailer spaces, exist in Glen Canyon City. City parks, playgrounds, commercial campgrounds and other recreation-oriented facilities do exist, however, in Page and Fredonia, Ariz., and Kanab, Mount Carmel, Orderville, and Escalante, Utah. Significant national and regional recreation attractions and use areas are nearby (table 7; see also regional EIS, part 1, chapter II, fig. II-26).

Other recreation use areas exist throughout the general geographical area but would not be impacted significantly if the proposal were to be implemented.

6. Archeology and History

Little is known archeologically of the lease area and immediate vicinity, although some work has been done by the proponent and the Museum of Northern

TABLE 7.--National and regional recreation use areas within the primary zone of influence of the El Paso Energy Resources Company proposed Red and Blue mines

Recreation Use Area	Administering Agency	Approximate Travel Time From Lease Area	1976[1/] Recreation Visits/Visitor Days[2/]	Major Recreation User Attractions																				Level of use in terms of carrying capacity (General), as regards the natural environment and man-made facilities, including crowded conditions, user experience levels, etc.
				Scenery	Driving	Camping	Picnicking	Hiking	Hunting	Fishing	Boating	Swimming	Nature Study	Works of Man	Cultural History	Archeology	Geology	Botannical	Zoological	Wilderness	Solitude	Winter Sports	Resource Pr.	
Glen Canyon National Recreation Area	National Park Service	1/2 hour	870,340 Visits (Visitor days not available)	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x			Very heavy spring, summer & fall use on Lake Powell & at campgrounds, marinas, & visitor centers. Capacity at marinas & campground usually at or above carrying capacity during this period each year. Use is increasing on an annual basis.
Zion National Park	National Park Service	1-1/2-2 hrs	1,090,000 V. 1,013,100 V/D use	x	x	x	x	x					x		x	x	x	x	x	x	x			Use of campgrounds, roads, and trails above capacity, April thru September, annually.
Cedar Breaks National Monument	National Park Service	2 hours	411,270 Visits V/D not calculated.	x	x	x	x	x					x				x	x	x	x	x	x		Moderate to heavy summer use, b generally below capacity. Winte sport is snowmobiling (Light).
Bryce Canyon National Park	National Park Service	1-1/2-2 hrs	636,200 Visits 246,000 V/D's	x	x	x	x	x					x		x		x	x	x	x	x	x		Use at or above capacity from April thru September, annually. Winter sport is snowmobiling. (Light)
North Rim, Grand Canyon National Park	National Park Service	1-1/2-2 hrs	433,000 Visits V/D use not calculated.	x	x	x	x	x					x		x	x	x	x	x	x	x	x		Use above carrying capacity Jun September annually. Permits required for trips to bottom of canyon. Winter use is snowmobiling (Light).
Markagunt Plateau (Navajo Lake, Panguitch Lake, et.al) on Cedar City Ranger District, Dixie National Forest.	U. S. Forest Service	1-2 hours	296,300 Visits + 652,800 V/D's use.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	Heavy summer use w/roads, campgrounds, and fisheries use abov capacity on summer weekends. B game hunting in fall is heavy. Snowmobiling & gathering forest products also heavy.
Paunsaugunt Plateau (Powell and Escalante Range and Districts, Dixie National Forest	U. S. Forest Service	1-2 hours	80,000 Visits 328,800 V/D use.	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	Summer use is heavy, but generally below carrying capacity, e cept for developed campgrounds. Big game & game bird hunting is very heavy.
Jacobs Lake and North Kaibab Ranger Districts, Kaibab National Forest	U. S. Forest Service	1-1/2-2 Hrs.	922,200 263,000	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x		x	
Escalante Planning Unit, BLM, including Escalante River Primitive area, Petrified Wood areas, Fifty Mile Mountain, etc.	Bureau of Land Management	1-1 1/2 Hrs	25,000 Visits (Estimated)	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x		x	Spring, summer and fall use below carrying capacity. Escalante River receives heavy use by backpackers & hikers. (No records available on total use).
East Paria Planning Unit including Lease area, Kaiparowits Plateau, Cockscomb, Hackberry Canyon, Paria Primitive area, Movie sets, etc.	Bureau of Land Management	0-1 Hour	25,000 Visits (Estimated)	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x		x	Spring, summer and fall use. Generally light except for Cock comb and Paria Canyon Primitive areas, and movie set locations.
West Paria and Vermillion Cliffs Planning areas, movie sets, hunting areas, etc.	Bureau of Land Management	1-1 1/2 Hrs	50,000 Visits (Estimated)	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x		x	Some spring, summer, and fall u but well below carrying capacit of area.
Coral Pink Sand Dunes State Park	State of Utah	1 Hour	47,640 Visits	x	x	x	x	x	x				x		x	x	x	x	x	x	x			Heavy use in spring and fall. Moderate summer use. Popular ORV use area.
Kodachrome Basin State Park	State of Utah	2 Hours	11,880 Visits	x	x	x	x	x	x				x		x	x	x	x	x	x	x			High summer use, but below capacity.
Escalante Petrified Forest Park	State of Utah	1-1/2-2 Hrs	Not Calculated	x	x	x	x	x	x				x		x	x	x	x	x	x	x			Low use except for gathering petrified wood.
Snow Canyon State Park	State of Utah	1-1/2-2 Hrs	130,330 Visits	x	x	x	x	x	x				x		x	x	x	x	x	x	x			Near or at carrying capacity.

1/ Recreation Use Records of Administering Agencies.

2/ Visitor Days Use not available.

* Wilderness is defacto and not designated.

Arizona 1974-75 (BLM file record) in neighboring areas on the Kaiparowits Plateau (BLM, 1976). These investigations have resulted in the recording of many archeological sites.

The National Register of Historic Places lists no sites in this area.

7. Esthetics

Lands involved in both the Blue and Red mine proposals have been designated as having common (class B) scenery (Roy Mann Associates, Inc., 1977). Landforms, rock formations, and vegetative patterns have some variety in form, line, color, and texture. However, these features, both singly and in combination, are common and representative of the characteristic landscape throughout the Kaiparowits Plateau. The characteristic landscape is neither outstanding nor distinctive in visual quality (figs. 2, 5, 7, 8).

The proposed Blue mine is in a seldom visited or seen part of Dry Wash. It is presently inaccessible by motorized wheel vehicles and cannot be seen from any travel route on the plateau. The proposed mine shafts, coal conveyor belt system, and mine plantsite for the Red mine is in the foreground-middleground (0-3 miles) viewing zone from the Last Chance Creek road. This is a low-standard four-wheel-drive road and is seldom used by the general travelling public.

The area involved in both proposals falls within BLM's IVb visual resource management classification. Management or project activities may subordinate the original composition and character of the area under this classification. Reclamation or rehabilitation measures after management or project activity completion must be directed toward establishing sites that could appear to be a natural occurrence within the characteristic landscape.

Except for the section of the travel corridor near Glen Canyon City, Utah, and within the Glen Canyon National Recreation Area (NRA), the proposed project area has been rated low in visual sensitivity. The proposed minesites are seldom visited; there are no designated wilderness areas, observation sites, or recreation use areas in the immediate vicinity; and local community attitudes favor development. The travel corridor near Glen Canyon City and within the NRA is highly sensitive to modification of the natural landscape. This section of road is visible from U.S. Highway 89, the only major travel route in the area. U.S. Highway 89 receives heavy local, regional, and national use by the travelling public. The travel corridor within the NRA is heavily used by recreationists for access to the Gunsight Canyon and Sit Down Bench areas within the NRA.

CHAPTER III

ENVIRONMENTAL IMPACTS

The impacts described relate principally to the proposed actions of the mine plans rather than of the associated preliminary proposals and are residual impacts not fully mitigated by the environmental requirements listed in chapter I. Additional impacts will result from a transportation system to handle full coal production.

A. NATURAL ENVIRONMENT

1. Land

Subsidence surface expressions, such as earth fractures, shallow depressions, and low ridges, could be expected within 10 square miles at the Red minesite and 480 acres at the Blue minesite. Subsidence above the mine workings could be as great as 90 percent of the mined coal thickness, depending upon the amount and strength of overburden, topography, mine geometry, and extraction ratio. Where overburden is thinner than 200 feet, surface expressions of subsidence are greater than those areas where overburden is thicker. Flamable or noxious gases present in part of the Red mine area could be released to the surface via subsidence fractures. Probable subsidence cannot be predicted without definitive studies in active large scale mines in the southern Utah coal fields. Likelihood of rockfall and slides along the edges of benches and cliff faces could increase but would be protected by mitigation measures. Rockfall and small slides may increase where roadcuts are necessary on the steep rocky slope at the Blue minesite.

Impacts to paleontological resources would consist of losses of plant, invertebrate, and vertebrate fossil materials for scientific research, public education (interpretative programs), and to other values. Losses would result from destruction, disturbance, or removal of fossil materials as a result of coal mining activities, unauthorized collection, and vandalism. A beneficial impact of development would be the exposure of fossil materials for scientific examination and collection which otherwise may never occur except as a result of overburden clearance, exposure of rock strata, and mineral excavation. All exposed fossiliferous formations within the region could also be affected by increased unauthorized fossil collecting and vandalism as a result of increased regional population. The extent of this impact cannot be presently assessed due to a general lack of specific data on such activities. Due to the present lack of data and accepted evaluatory criteria for determination of significance, no meaningful assessment can be presently made as to the extent and nature of the loss of these paleontological values to science or education, or hence to the significance of potential impacts on the fossil record.

Other than coal, there are no known mineral resources in the area that would be impacted.

Soils would be disturbed on 88 acres required to operate the Blue mine and on more than 870 acres needed to operate the Red mine (table 1). Erosion rates could increase 1.0 to 3.0 cubic yards per acre per year by water action at the minesites where soils are freshly disturbed and exposed, and as much as 20 cubic yards per acre per year by wind erosion. Proper mitigation through erosion control measures would result in lower total soil movement by reducing the time of soil exposure to less than 1 year. After facilities are built and landscaped, and after reclamation, overall erosion rates could be less than under natural conditions, as indicated in a previous impact analysis (BLM, 1976). Concentration of runoff caused by construction could increase the erosion in drainage collection systems. Compliance with SMCRA regulations will preclude significant adverse soil impacts. (See chapter I, Legally Enforceable Mitigating Measures).

2. Water

The proposed action would require about 3,500 acre-feet of water per year, about 1,000 acre-feet (Blue mine-30, Red mine-970) for mining and related activities and 2,500 acre-feet (Blue mine-170, Red mine-2330) for additional community supply owing to the increased population. About half of the community supply water used domestically would be discharged as effluent from sewage treatment plants and could be revised for agriculture (part 1, chapter IV, Water).

Removal of coal and subsequent subsidence and fissuring could decrease the flow of springs and streams on the 10-square-mile area overlying the Red mine. Although spring flows are small, any loss of watering places would restrict the use of the area by livestock and wildlife.

Water for mining would be pumped from the ground and community supply water would probably come from water presently being used for irrigation.

The effect on ground water caused by mining would be gradual. The worst effect would probably be decreased spring flow in Last Chance Creek adjacent to the mining area during the latter part of the mining period. Mining would change the direction and interrupt ground-water flow. Mining and water development would decrease hydraulic heads in the Straight Cliffs Formation (which includes the Drip Tank Sandstone Member above the coal-bearing John Henry Member) and later in the overlying Wahweap Formation. Development of deeperwater-bearing units would decrease or alter distribution of the regional ground-water resources and cause local water-level declines.

Subsidence and associated cracking could possibly drain water-bearing sandstone above the coal beds and increase recharge to lower sandstone beds.

Once mine-related subsidence begins the drainage of strata above the mined beds would increase and might temporarily dry some springs. Subsidence fractures at the land surface would temporarily decrease surface runoff and increase infiltration. This, in turn, would increase ground-water recharge and might eventually restore spring flows or create new springs.

If the required water is pumped from the Straight Cliffs Formation, little or no effect is expected on Lake Powell. Data indicate that this water is presently evaporated and transpired before reaching the lake. If all the required water is pumped from the Navajo Sandstone, available data indicate that any noticeable effect would reach Lake Powell between 1 and 2 years after beginning of pumping. After pumping 1000 acre-feet per year for 10 years, about 40 percent of the water pumped would be diverted from the lake.

Construction and mining activity would result in increased sediment loads in streams near the mines. The increased sediment loads would probably be minimal one to two miles downstream because the streams are carrying all they can now.

Leakage from the 10-acre (100-acre-foot) freshwater reservoir at the Red mine would probably be of better quality than normal flow from springs and seeps and, therefore, would be beneficial. Spills of oil from storage tanks might seep into the underlying rock, but seepage to the water table would be slow unless rocks at the spill site were unusually permeable. If water leaking from lagoons containing treated sewage moves a sufficient distance through fine-grained rocks, the effluent probably would be filtered and purified.

Subsidence could eventually facilitate leakage from a disposal pond through fractures, although a liner would minimize leakage. An alternative would be to locate disposal ponds in areas not subject to subsidence.

3. Air

Total annual emissions from operation of the proposed Blue mine potentially could be as great as 7,040 tons (20 tons from mining activities and 7020 tons from travel on unpaved roads. Total annual emissions from the proposed Red mine could be about 280 tons (coal transfer, storage, and conveyance). Therefore, the mine operations are subject to PSD permit review by EPA and Best Available Control Technology (BACT) and best management practices will be required to control fugitive dust.

Because of the mitigation measures that will be required impacts to the air owing the operation of the Red and/or Blue mines would be minimal. (See chapter I, Legally Enforceable Mitigating Measures.) Any additional deterioration owing to the population increase associated with the Blue mine would be very small. The impact from population increase associated with the Red and Blue mine would not exceed any NAAQS if the majority of workers located in a possible new town near and north of Glen Canyon City (table 8, see also part 1, chapter VIII, medium and high level scenarios). If the majority of workers located in Page, Arizona, pollutant concentrations in Page would be increased, but no NAAQS violations are anticipated.

TABLE 8.--Pollutant concentrations from possible new town[1] near Glen Canyon City, Utah

[Source: Environmental Protection Agency, 1978. Data are in micrograms per cubic meter (incremental increase)]

Pollutant averaging time	Mid-town	Town outskirts (3 miles from town center)	NAAQS Primary/ secondary
Particulates:			
Annual	16	4	75/60
24-hour	54	54	260/150
Sulfur dioxide:			
Annual	8	2	80/NA[2]
24-hour	27	27	365/NA[2]
3-hour	48	48	NA[2]/1300
Nitrogen dioxide:			
Annual	26	6	100/NA[2]
Hydrocarbons:			
3-hour	481	481	[3]160/160
Carbon monoxide:			
8-hour	1,606	1,606	10,000/10,000
1-hour	2,632	2,632	40,000/40,000

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[1] The new town analysis assumes a population of 11,600 located near and north of Glen Canyon City.

[2] Not applicable.

[3] 160 $\mu g/m^3$ is a guideline, not a standard.

4. Vegetation

As the leases would be mined by the underground method, the only serious impacts on vegetation would be caused by mine-mouth facilities and access roads. The Blue mine would destroy 33 acres of vegetation, the Red mine 870 acres; facilities would occur about 903 acres and ancillary requirements off lease would impact an additional 55 acres. Of the total 958 acres, 703 (73 percent) is the Pinyon-Juniper Woodland type, 212 (22 percent) the Desert Shrub Type, and 43 (5 percent) the Streamside Type.

The two endangered and two threatened plant species listed in chapter II may be located in the area planned for either facilities or roads. If so, they and their habitat will need to be located and protected.

5. Wildlife and Fisheries

The small number of wildlife in the area limits the wildlife impact.

Surface facilities would occupy 958 acres and the Red mine plant facilities would occupy one of the few sites where water is available for wildlife use. The habitat could support approximately 12 deer year round or 35 deer seasonally. This productivity would be lost for the life of the mine. Productivity for other wildlife, species such as jackrabbit, cottontail, birds of prey, mourning dove, other small birds, small rodents, and predator mammals would also be lost until disturbed areas are reclaimed.

Eliminating or reducing flow of springs and seeps would have a significant impact on some species. During long dry periods the range of these species is limited to habitat within approximately 1 mile of water. Loss of one water source could eliminate such species as chukar, deer, and bighorn sheep from about 3 square miles or 2,000 acres of otherwise suitable habitat.

The increased mine-related human population would reduce local wildlife populations and their reproductive potential by increased harassment, poaching, indiscriminate shooting, and destruction of habitat. Approximately 2,000 acres of wildlife habitat might be permanently occupied by new housing related to the proposed Red mine at full production. This habitat would be lost to all species except those compatible with an urban environment. Data are not available to predict total losses.

Increased traffic on present, upgraded, and new roads would result in increased loss of wildlife due to vehicle strikes. Powerline poles in an area devoid of tall trees would provide attractive hunting perches for birds of prey; however, the presence of such perches near roads would increase the vulnerability of the large birds to shooting.

B. CULTURAL ENVIRONMENT AND LAND USE

1. Agriculture, Range, and Timber

The vegetation destroyed by the project would reduce grazing capacity by 30 AUM's. Increased vehicle traffic would disrupt normal grazing and watering patterns for the cattle.

2. Socioeconomics

The proposed Blue mine would add 850 to 900 new residents; the Red mine would add 11,000 to 11,500 by 1990. Distribution, social, and economic impact of the new population is assessed in part 1, chapter IV.

Population increases of this magnitude in established small communities frequently are characterized by high rates of job and community transiency, high employee turnover rates, relatively high rates of juvenile delinquency, petty crimes, suicide, and family problems.

Urbanization associated with these mines would result in several significant impacts. The number of permanent and mobile homes would increase as would the need for increased school space and teachers. Supporting businesses and industry would grow. The community lifestyle would become more cosmopolitan, and governmental and political bases would change.

Other impacts would be the establishment of a taxing system at the city, county or state level to provide for the costs of establishing, operating, and maintaining sewers, water systems, streets, garbage collection, police, and fire protection.

The annual payroll of the assumed 145 workers at the proposed Blue mine would be about 2 million dollars, assuming an average annual salary in the range of $12,000-15,000 for mine employees. The annual payroll of the assumed 1,825 workers at the proposed Red mine would be about 25 million dollars (1978 dollars).

3. Transportation and Utilities

The preliminary proposal to upgrade 28 miles of county road and build 6 miles of company road to the Blue mine will improve the transportation system on the Kaiparowits Plateau. It may carry traffic volumes in excess of the 300 vehicles per day scheduled at the Blue mine, dependent on whether or not the secondary proposed access road is upgraded to also provide service and work force access to the Red mine (fig. 10) and on upgrading of the existing Smoky Mountain road northward to Escalante and beyond. Recreationists and others will use the road. If either the primary or secondary route is upgraded, it could also serve the estimated 1,800 service and work force vehicles per day to the Red mine. Surfacing is necessary for effective dust control and driving safety.

It is anticipated that gravel surface and appropriate dust control measures will be satisfactory for traffic to the Blue mine but that paving will be necessary when the Red mine is developed. However, use of the same road by the Blue mine traffic and the nearby proposed Kaiparowits No. 5 mine (fig. 12) traffic might justify paving prior to development of the Red mine (see also requirements in chapter I, Legally Enforceable Mitigating Measures). The existing county road through the Glen Canyon National Recreation Area (NRA), the primary proposed access to the Blue mine, presently is not adequate for the proposed traffic. It is not known whether or not the county road can be widened and upgraded through the NRA and used for heavy commercial traffic. Both improvement and use after improvement are in dispute, involving Kane County, NPS, BLM, and the Blue Mine and Kaiparowits No. 5 mine proponents.

Two power corridors are under preliminary consideration by the proponent (fig. 10). The corridors are 25 to 35 miles long and would disturb from 130 to 455 acres, dependent on the final choice of routes. Power is available, and no major impact to power systems in the region is anticipated. No major impact is anticipated from telephone lines which probably will follow the access roads to the Red and Blue mines.

The proponent has preliminarily proposed several methods of coal haul from the Red mine to potential unidentified markets outside the region. None of these proposals are definite. Impacts that might result from their construction and use are significant but cannot be quantified at this time.

4. Archeology and History

No properties currently on the National Register properties would be impacted. Archeological sites may be found during the intensive survey that will be made on the proposed disturbed area. Until such a survey is made the extent of the impact cannot be determined. Increased population because of mining may result in more vandalism of archeological and historical sites off the area. Improved access may also result in increased vandalism to sites that may be present.

5. Recreation and Esthetics

Environmental impacts to the recreation resource within and immediately adjacent to the lease areas would be minimal because of light recreation use and minimal opportunities. Impacts to regional and national recreation attractions, especially the the Glen Canyon National Recreation Area, could be significant because of the increase of about 900 new residents for the Blue mine and more than 11,000 for the Red mine.

Onsite impacts would include (a) displacing or temporarily eliminating present recreation opportunities by mining activities; (b) an increase in nuisance, noise, dust, and other air pollutants (see Air Quality section, chapter III); (c) some increased observation of mining activities; (d) increases in sight-seeing in all types of vehicles because of improved access; and (e) increased littering, vandalism, and off-road vehicle use.

Impacts to adjacent regional and national recreation attractions (table 7) would result from increased population. The increase could result in an additional annual 214,000 recreation visits and 344,000 visitor days more than the 1976 use rate of more than 5,029,000 visits and 8,061,000 visitor days. In relation to the overall use rate and carrying capacities of all regional and national recreation attractions, this increase would not be significant if uniformly distributed. However, because of the proximity of the proposed project to the Glen Canyon National Recreation Area, most of the increased recreation visits and use would be expected in this already heavily used area; mining and recreation traffic, within and adjacent to the NRA, could conflict if such traffic is not separated. Some impacts on other overused areas could also be expected, including increased hunting, fishing, and camping pressures, ORV use, vandalism, and littering and deterioration of camp and picnic sites.

Mining facilities and activities would modify the natural remote character of the proposed Red and Blue mine facilities area. The preliminary proposed Red mine conveyor system from Last Chance Creek to Four Mile Bench, if constructed, would significantly modify the visual environment.

Improving the present access system would scar and otherwise modify the natural landscape, primarily by cuts and fills. Dust from haul and access roads would be a visual pollutant, and vastly increased traffic on the present access road from Glen Canyon City would intrude on the natural landscape.

CHAPTER IV

MITIGATING MEASURES

All legally enforceable mitigation measures are discussed in chapter I. Other mitigating measures are discussed as project alternatives in chapter VIII.

CHAPTER V

ADVERSE EFFECTS THAT CANNOT BE AVOIDED

The coal is too deeply buried to be recovered other than by underground mining, and as much as 50 percent is not recoverable because some of the seams are too thin (less than 4 feet thick), and some are too close together to be mined by present-day methods.

Subsidence cannot be avoided, and related hazards from rockfalls and rockslides could thereby increase. Open subsidence fractures could endanger livestock and human beings. Mine gases in the Red mine area could reach the surface through subsidence fractures. Such gases if present, could affect some types of vegetation deleteriously and, in large enough quantities, could be a fire hazard.

Unavoidable destruction, disturbance, and removal of paleontological resources, both exposed and unexposed, would occur. The significance of this impact cannot be meaningfully assessed now because of the lack of data and evaluatory criteria.

Soils

Soil disturbance on a total of about 958 acres would be largely unavoidable and erosion would increase during periods when the surface is exposed. Most of the disturbed soils would be taken out of production during the life of the project. Compliance with SMCRA regulations will provide for soil protection and conservation measures which will preclude significant adverse soil impacts.

Water

About 3,500 acre-feet of water per year would be required--1,000 acre-feet for mining and 2,500 acre-feet for the increased population. About half of the domestic requirement would be discharged as effluent from sewage treatment plants and could be reused. The other half and the mining requirement would be consumptively used.

Mining would interrupt ground-water flow in the John Henry Member of the Straight Cliffs Formation and lower heads in the Drip Tank Sandstone Member, the Wahweap Formation, and the alluvial deposits that discharge water to seeps and springs used by wildlife and livestock. Spring flows may be reduced, and, although the quantities of water involved are very small, the loss of a few watering places for livestock and wildlife would restrict their use of the 10-square-mile area overlying the mine. Ground-water flow patterns in the mine area would be altered. If ground-water for mining is pumped from the Navajo Sandstone inflow to Lake Powell could decrease by 400 acre-feet per year after 10 years of pumping.

Air

The air quality impact from a population increase associated with the Red and Blue mine would not exceed NAAQS at a possible new town or at Page, Arizona (table 8, chapter IV).

Vegetation

Vegetation would be removed from 958 acres in developing the various facilities for the mines. This would result in an annual loss of 30 AUM's of grazing capacity. Juniper trees suitable for fenceposts would be lost from the woodland during the construction phase.

Wildlife and fisheries

Loss of wildlife due to vehicle strikes, indiscriminate shooting, poaching, or loss of habitat would be unavoidable. Loss of productivity on 958 acres for the life of the mine, permanent loss of 2,000 acres of habitat due to urbanization, and loss of habitat due to elimination of springs or seeps would be unavoidable.

Socioeconomics

Lifestyles and subcultural values typically cannot be mitigated by monetary assistance. Consequently, major unmitigated impacts would be urbanization and a more cosmopolitan community lifestyle.

Transportation and utilities

Increased traffic to the Blue mine and later to the Red mine would impact existing traffic on U.S. 89, especially in the slow speed area on the Glen Canyon Bridge.

Recreation and esthetics

The remote, unoccupied appeal of the two minesites, access and haul routes, and utility corridors will be lost during the life of the mines.

Recreation use, both onsite and regionally, will increase. More recreation use, if not planned for, accommodated, or regulated, could deteriorate the quality of recreation experience at existing recreation areas.

Installations and activities associated with the mines would impose significant industrial intrusions and modification of the natural setting, irrespective of mitigating measures.

The access road in Dry Wash to the Blue mine and the proposed Red mine coal conveyor system from Last Chance Creek to Four Mile Bench would create the most significant adverse impacts to the esthetic resource.

Archeology and history

Increased population in the area may result in vandalism to archeology and historical sites within the region.

CHAPTER VI

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

Natural environment

Activities due to and related to mining would result in impacts to an unknown number of exposed and unexposed fossil localities. These activities would also result in a gain in knowledge of paleontological resources due to surveys and exposure of resources which might never have been found without excavation.

Soils on 958 acres would be taken out of production for the life of the mining operation at facilities sites and on an additional unspecified acreage used for transportation systems. Through proper reclamation, the long-term impact on soils should be minimal. After mining, the area would be revegetated and returned to a condition approximately as productive as now.

Reductions in spring flow and streamflow may be short- or long-term changes, but relocation of springs would probably be long term, and use of the area by wildlife and livestock might decrease.

In the short term, vegetation and the associated range forage and forest products would be lost to the project. In the long term, after reclamation, the areas should be nearly as productive as they are now.

Loss of surface-water sources would eliminate use of otherwise suitable habitat by some species. Chukar could be eliminated from the Last Chance Creek drainage for the life of the mine.

Urbanization related to the proposed mining would eliminate long-term productivity on the area occupied. If more houses are built on East Clark Bench northwest of Glen Canyon City (fig. 1), the potential for establishing an antelope herd in that area could be eliminated.

Cultural environment

These mines would cause some urbanization and a substantial growth in total regional income. The regional tax base would increase, but full time agricultural employment probably would decrease.

Without adequate regional planning and the development of other sources of income, this area could become depressed when the mines close. People would move from the area. Mobile homes would be sold or relocated. Schools would close. Supportive services dependent on sales, and property taxes would suffer. Very possibly, the mortgage market would also suffer.

At the cessation of mining and reclamation, traffic associated with the mines would cease; however, the improved road and utility network would have increased traffic across the Kaiparowits Plateau for other purposes. This traffic would continue. Utility lines would probably also remain after mining ceased.

Short-term use of the area for mining will tend to increase the use of the area for recreation, primarily because of improved and more reliable access. Increases in long-term use of the recreation resource can be expected from increased population and knowledge of the area. The recreation resource of the area is now minimal, but it is also underutilized. Considerable increase in use can be accommodated without deteriorating long-term recreation opportunities.

The esthetic resource of the proposed impact area would be modified from a remote, uninhabited environment to one with significant industrial facilities and activities, especially during the life of the mine and until reclamation is completed.

The esthetic resource, except for minimal amounts of mine remnants and residues, would return to near its present condition after reclamation.

Any archeological and historical sites disturbed during development of the site would result in a long-term impact to the inplace value of that site. Collection of sites that might be found will insure recording of information that could otherwise be lost to natural forces or vandalism.

CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The major irreversible and irretrievable commitment would be non-recovery of 202 million tons of coal in the Red mine and about 6 million tons in the Blue mine. Unknown tonnages would be irretrievable because some seams are too thin for mining, others are too thick for current mining methods, and still others are too close together for safe mining.

Coal in the K_1 bed would be left because in only 5 of 89 boreholes was it more than 30 feet above the K_2 bed; in the remaining 84 boreholes, the interval was less than 30 feet. Safe practice would not normally permit mining two beds so close together. Conditions permitting, however, K_1 coal would be mined. One other bed, the I, is present but it is generally less than 4 feet thick and not economically recoverable at present.

An undetermined number of uninventoried exposed and unexposed fossil localities would be lost or disturbed.

Changes in soil characteristics through disturbance are essentially irreversible, as is soil loss by erosion, which would occur to some extent on 958 acres. Fertilizers, other soil amendments, and energy resources used in reclamation would be irretrievable.

Water used for mining and other purposes (3,500 acre-feet per year) would be irretrievable except for that discharged as sewage effluent (1,250 acre-feet per year), which could be reclaimed. The use of water by the increased population (2,500 acre-feet per year) may be irreversible if the people choose to remain in the area past the life of the mine. Disruption of ground-water flow patterns due to mining and subsequent subsidence would be irreversible. Spring flows would be at least temporarily reduced which would restrict the use of the area by wildlife and livestock.

Vegetation would be irretrievably lost to the project. Forage losses of 30 AUM's per year for 30 years would total 900 AUM's. Some woodland products would also be lost. Proper reclamation, however, would restore some, if not most of the loss.

Wildlife resources irretrievably lost would include animals struck by vehicles and shot, and loss of habitat. Such losses would be reversible if species and habitat are not impacted to the point that reproduction capacity is impaired. Loss of wildlife habitat due to elimination or reduction of surface water sources would be irreversible. Ten square miles overlying the Red mine could be affected. Based on experience in other areas, the loss of wildlife habitat due to urbanization would be irreversible.

Irreversible socioeconomic effects are discussed in the regional EIS, part 1, chapter VII. Any long-term population growth that is induced by mining will cause a long-term commitment of the air to some deterioration.

reclamation plan may not reflect the requirements of the initial regulations. However, in this statement the applicable initial regulations are considered as required Federal mitigating measurs.

The mining and reclamation plan should be returned to the operator, with a request that it be revised in accordance with the applicable initial regulations. As soon as the mining and reclamation plan is revised and returned to the Geological Survey, it will be evaluated by the OSM to determine compliance with the requirements of 30 CFR 700.

Action could also be deferred until the plan is modified to include one or more of the alternatives discussed below in subsection E. These alternatives if implemented would reduce or avoid some environmental impacts of the proposed action.

C. PREVENT DEVELOPMENT OF THE LEASE

1. Reject the Mining and Reclamation Plan

The Secretary may reject a proposed plan that does not meet the prescriptions of applicable law and regulations under his authority, including the potential for environmental impact that could be reduced or avoided by adoption of a significantly different course of action by the applicant. Except when a mine plan does not comply with existing regulations, the Secretary cannot under present circumstances reject the proposed plans to the extent that a de facto cancellation of a lease results unless he seeks and obtains additional authority from the Congress. Viability of this option is dependent upon timely legislative action; the option of rejecting the proposed plans pending legislation remains available.

If the Secretary were to reject the mining and reclamation plan, the lease would not be mined, and impacts previously discussed would be deferred until an acceptable plan was approved. The lease would continue in its present condition, subject to modification by natural processes and by the continuation of other existing activity and uses--and to further modification by the surface owner to meet other uses. However, the development of alternative sources of energy, such as other coal mines in the county, or a reduction of national energy consumption, could result. The applicant could correct the deficiencies in the plan and resubmit a modified mining and reclamation plan for approval. The result would be similar to that described in the alternative "Defer Federal action."

2. Seek Legislation to Cancel the Lease

The Secretary has very limited authority with respect to cancellation of an existing Federal coal lease. One such authority is prescribed in the lease terms entitled "Proceedings in case of Default."

A second authority was mandated by provisions of section 6 of the Federal Coal Leasing Amendments Act of 1975 (P.L. 94-377) which was subsequently written into regulations as 43 CFR 3520.2. The authority relates to failure of the lessee to meet the requirements for diligent development of the lease as defined by the Act.

The authority to cancel on other grounds would require congressional authorization for such action as well as for the requisite funds for compensation to the lessees. The Administration has not requested such legislation, and the Congress has not initiated such legislation related to the matters considered in this statement. The possibility of such actions is a matter for further consideration by the Administration and the Congress in the light of this environmental statement and other relevant nonenvironmental concerns.

To the extent that future coal production from this lease was curtailed or halted, alternative sources of energy would be required to meet anticipated needs and demands. The time required to replace the coal production potential could range from a few to several years. If this lease were cancelled through congressional authorization, all physical, biologic, and socioeconomic impacts stemming from the proposed mine would be avoided. Conversely, if development eventually were authorized, environmental impacts as discussed previously in this statement would occur, although impacts would be deferred in time and perhaps reduced because of changes in technology or requirements imposed at that time.

3. Exchange the Existing Lease

If the Secretary determines it to be in the public interest, he may initiate a proposal to the lessee for exchange of the existing Federal lease involved in this proposal for lease of other tracts of Federal coal or tracts of Federal sodium, phosphate, potash, or sulfur of comparable value, or for a grant of various future rights.

The Department of the Interior considers that the public interest would be so served if the Secretary finds that the benefits of production from the lease would not outweigh the adverse effects, or threat of damage of destruction to agricultural production potential, or scenic, biological, geologic, historic or other public interest values from lease operations. In exercising his discretion to exchange mineral leasing values in the public interest, the Secretary shall consider, but is not limited to, consideration of these elements of the public interest: recreational use; archeological or historic values; threatened or endangered species; proximity of residential or urban areas; study for potential inclusion in the wilderness or wild and scenic rivers systems; and value for public highways, airports, and rights-of-way.

Should the Secretary initiate such a proposal, the lessee is under no obligation to enter into such negotiations and may refuse to consider it.

If such a proposal is made and is rejected by the lessee, or if negotiations are entered and not agreeably concluded by the parties, and if the operations described in this statement are not otherwise prevented, such operations would eventually proceed and result in the impacts identified therein.

If an exchange proposal is made, accepted, and agreeably concluded for coal that is contiguous or very near to the existing lease, the proposed plan would have to be revised, resubmitted, and assessed. If the new plan encompasses the same methodology to be used in coal development, many of the impacts described herein would likely be very similar to those resulting from the new proposal, with a relatively short-term delay (several years) in their initiation. If a wholly different methodology is proposed for development of the replacement lease (e.g., undergound versus surface mining), it could be substantially different from those described in this statement, and cannot be forecast at this time.

Presumably the unacceptable impacts or effects prompting the exchange would be avoided or substantially reduced in development of the replacement lease and found to be in the public interest. The existing lease would be relinquished, would not be mined, and would continue in its present condition as discussed below.

If an agreeable exchange were made for coal located elsewhere, or for a different mineral commodity located elsewhere, the relinquished lease would continue in its present condition, subject to modification by natural processes, by the continuation of other existing uses and activity, and to further modification by the surface owner to meet other uses. Potentially, the coal reserves relinquished would be withdrawn from development and this source of energy foregone. Direct financial benefits to the public may change in an exchange of leases.

The impact of exploration and development of the replacement lease under these circumstances will be translocated in space and time. They will relate to time and location, physical environment at the new site, mineral commodity involved, development technology proposed and approved, and other factors, none of which can be quantified or evaluated until the replacement lease is identified. The environmental impact of potential development of the replacement lease rights to be granted would be evaluated and considered in the exchange process, and while they may be greater or less than those described in this statement, they must be ultimately judged by the Secretary to be more environmentally acceptable than development of the relinquished lease, and to be in the public interest. Costs to the Department in identifying and evaluating one or more replacement tracts to be offered in the exchange could be substantial, and very likely be significantly more than the lessee's costs in establishing the fair market value of the tract to be relinquished.

4. Suspend Operations

The full development of existing leases could be delayed by suspension of operations. If such action were taken, there would be no additional incremental environmental impact on the area, and it would continue in its present condition, subject to further modification by natural processes, the continuation of existing mining activity, and such future uses of the surface as the owners may decide.

The authority of the Secretary of the Interior to suspend operations on existing leases has already been utilized on other Federal leases. Suspension of operations of this existing lease, for reasonable periods, with proper grounds, could be imposed. The Secretary cannot, under present circumstances, suspend operations to the extent that a de factor cancellation of a lease results unless he seeks and obtains additional authority from Congress. Viability of this option is dependent upon timely legislative action; the option of suspending operations pending legislation remains available. Impacts of this alternative would be similar to those described under "Cancel the lease."

5. Federal Reacquisition of Leased Rights

The outstanding leasehold interests could be acquired by the Secretary. The ability to acquire the leasehold interests is not granted by the existing relevant statutes and would require Congressional authorization for such action as well as for the requisite funds for compensation of the lessees. To date, the Administration has not requested such action, and the Congress has not initiated or considered such legislation; the possibility thereof is thus conjectural at best. The major effects of such Congressional authorization would be similar to those of cancellation of the leases as previously discussed.

D. RESTRICT DEVELOPMENT ON THE LEASE

The subject leases convey the right to develop, produce, and market the Federal coal resource thereon if all other terms and conditions have been met by the lessee. In general, the Secretary does not possess the authority to arbitrarily restrict development either as to location or rate. Various measures that may tend to restrict development may be taken by the Secretary at any time in the interest of conservation of the resources or in the protection of various specific environmental values in accordance with existing laws and regulations; for example, the National Historic Preservation Act of 1966, the Endangered Species Act of 1973, etc.

Thus, under present conditions, a general effort to restrict or regulate development of the existing lease for reasons other than failure to comply with existing laws and regulations would constitute a selective application of the "prevent development" alternative already discussed; that decision, as it related to impacts, possible litigation, and the need for authorizing legislation, would be relevant in this instance.

In addition, application of this alternative might not permit maximum recovery of the coal resources and would thus be contrary to principles of conservation embodied in the legislation which authorizes the leasing of these lands for the purposes described. It is entirely possible that such selective mining would leave isolated blocks of coal that might never be recovered owing to the high costs of mining such remnant areas at a later date.

E. REQUIRE MODIFICATION ON THE MINING PLAN

1. Company Proposed Alternatives

El Paso's mining plan is based on conventional room-and-pillar methods. If conditions warrant, the company has indicated that it will consider longwall and (or) shortwall mining methods. It is not known how the different mining methods would affect subsidence.

An alternate coal haul transportation route from the Blue mine to Glen Canyon City has been proposed. This route would follow Nipple Creek, west of Nipple Bench (fig. 10). About 28 miles of existing jeep trail would be improved to a travel surface width not to exceed 35 feet. About 225 acres would be disturbed, resulting in loss of vegetation and wildlife habitat.

2. Other Alternatives and Optional Mitigating Measures

In the Red mine area, the El Paso Coal Co. has proposed to straighten and realine about 3 miles of Last Chance Creek at the plantsite. If Last Chance Creek were not realined and bridges were installed, the potential for scour and bank cutting would be reduced, and land on both sides of the creek, if necessary, could be used for surface facilities.

Plants, other than those normally growing in the area, (especially those beneficial to wildlife) could be tested for revegetation. Protection for any threatened or endangered plants on the site could include adjusting or moving the encroaching operation.

3. Alternative Powerline Route

An alternate powerline route following the general alinement of a regional transportation-utility corridor would minimize additional environmental impacts; also, the power would be available to other mines on the plateau. The proposed route would cross 10 miles of deer winter range. Deer use the area but little, but some resident deer may be found year round near perennial water sources. The area also provides feeding and nesting habitat for passerine birds and small mammals and hunting territory for predator mammals and raptors. Powerline impacts to mule deer on this route would be limited to the temporary disturbance during construction. No loss of animals or permanent avoidance of the area would be expected.

Some small mammals, reptiles and amphibians may be killed by construction equipment; however, reduction to the total community would be small. The powerline poles would provide hunting perches for raptors in an area where few tall trees exist. This would be a positive impact, allowing more productive hunting with less expenditure of energy. This impact would be offset by the location of the powerline along the roadway and the subsequent exposure of raptors to shooting and disturbance. Raptors most susceptible are the golden eagle and the red-tailed, Swainson, and ferruginous hawks.

Loss of wildlife due to construction or illegal shooting would be unavoidable. Any such loss would result in a short-term decrease of local populations, but regional long-term population trends would not be affected.

Impacts to vegetation and range would be minimized by selecting the alternate powerline route.

CHAPTER IX

CONSULTATION AND COORDINATION WITH OTHERS[1]

A. FEDERAL AGENCIES

Reviews of first draft of environmental impact statement by national and (or) local offices of the Bureau of Land Management, State Director for Utah; U.S. Geological Survey; USDA Forest Service; Fish and Wildlife Service; Soil Conservation Service, and National Weather Service.

B. UTAH STATE AGENCIES

Geological and Mineralogical Survey, Division of Water Resources, Division of Water Rights, Division of Health, State Engineer, State Climatologist, Division of Wildlife Resources, Division of State Lands, Division of Parks and Recreation, Department of Transportation, Outdoor Recreation Agency, and Institute for the Study of Outdoor Recreation and Tourism, Utah State University, Logan, Utah.

C. COUNTY AND LOCAL GOVERNMENT

Five County Association of Governments

D. PRIVATE INDIVIDUALS AND ORGANIZATIONS, INDUSTRY AND NONINDUSTRY

James Compton, Bill Ellwanger, O. D. Niedermeyer, Jr., and Charles Bowman, El Paso Coal Company. John E. Nelson, Kane County Engineer, and Raymond D. Behle, Kane County Attorney.

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[1] See part 1 of the FES for a description of the consultation and coordination efforts involved in the preparation of the entire FES.

CHAPTER X

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SITE SPECIFIC ANALYSIS
OF THE PROPOSED CHANGES
TO THE KAIPAROWITS NOS. 1 - 5 MINES
KANE COUNTY, UTAH

Lease numbers:

U-087805
U-087806
U-087828
U-087833
U-087834
U-087835
U-092139
U-092140
U-092141
U-046486
U-096494
U-096495
U-096497
U-0101142

PROPONENTS: MONO POWER COMPANY ET AL.

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CHAPTER I

DESCRIPTION OF THE PROPOSED ACTION

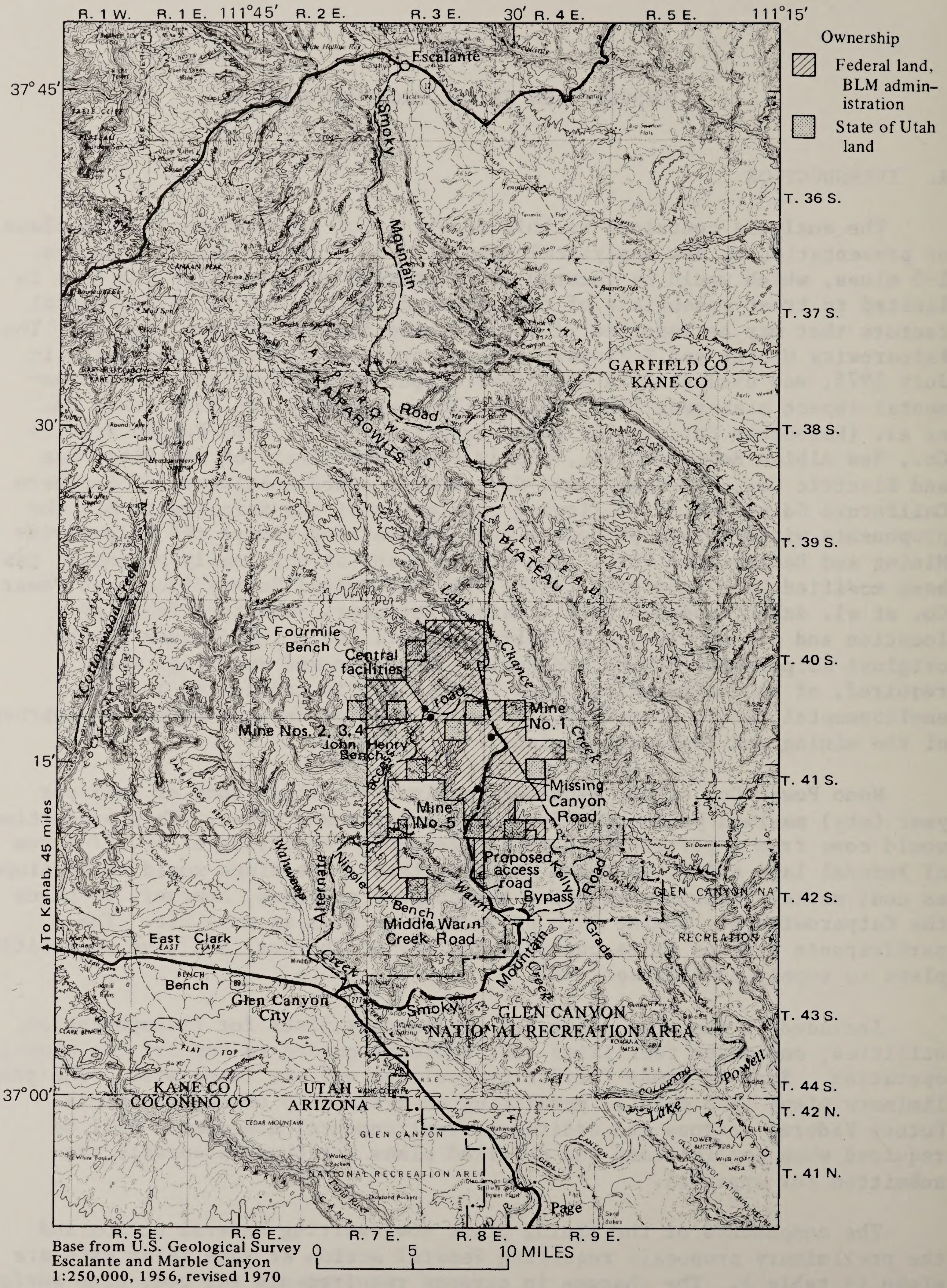
A. INTRODUCTION

The analysis contained in this report is of the changes in mine plans or presentation of new analytical data for the proposed Kaiparowits Nos. 1-5 mines, which would be located in southern Utah (fig. 1). The text is limited to treat essentials of the proposed actions and of environmental factors that may be impacted if the proposed actions are implemented. The Kaiparowits Mining and Reclamation Plan, prepared by Kaiser Engineers in July 1975, was evaluated in the final Kaiparowits power project environmental impact statement (BLM, 1976). The proponents are Mono Power Co. et al. (Resources Co., wholly owned subsidiary of Arizona Public Service Co., New Albion Resources Co., wholly owned subsidiary of San Diego Gas and Electric Co., and Mono Power Co., wholly owned subsidiary of Southern California Edison Co.). Following completion of the Kaiparowits EIS the proponents withdrew all proposals and applications except the Kaiparowits Mining and Reclamation Plan. The mining plan, as originally proposed, has been modified by a submittal to the U.S. Geological Survey from Mono Power Co. et al. dated November 1976. Kaiser Engineers submitted facility location and design changes in February 1977. Only the changes to the original Kaiparowits Mining and Reclamation Plan and updating, where required, of the Kaiparowits Power Project EIS is considered in this environmental impact statement. The only pending Federal action is approval of the mining and reclamation plan.

Mono Power Co. et al. proposes to mine 12 million tons of coal per year (mty) maximum production from five underground mines. This production would come from a portion of a total leasehold consisting of 40,277 acres of Federal land and 7,499 acres of State land. The mines would be developed as coal markets become available; the company proposes, however, to place the Kaiparowits No. 5 mine into production as soon as possible. The participants have no sales contract for any of the coal and have no positive plans to supply spot market coal.

Included in the mine plans are preliminary plans for transportation, utilities, and other facilities that would be needed to support the mining operation. Some of these facilities would be off the lease area. The preliminary plans lack detail, permitting analysis only of major impacts. Future Federal actions and additional environmental assessment will be required when applications and detailed plans for these proposals are submitted for approval.

The components of the mining plans now awaiting Federal action and the preliminary proposals requiring Federal action at some later date are given in table 1. The changes in acreage requirements for coal mine surface facilities are shown in table 2.



Base from U.S. Geological Survey
Escalante and Marble Canyon
1:250,000, 1956, revised 1970

FIGURE 1.--Map showing locations of coal leases, proposed Kaiparowits Nos. 1-5 mines, Kane County, Utah.

TABLE 1.--Summary of data in the Kaiparowits Nos. 1-5 mine plan

	Kaiparowits Nos. 1-4	Kaiparowits No. 5	Total
Leasehold area (acres):			
Federal lease	40,277[1]	---	40,277
State lease	7,499[1]	---	7,499
Private land	---	---	---
Total	47,776	---	47,776
Proposed action:			
Product	Washed coal.	Raw coal.	
Market	Unspecified utility companies.	Unspecified utility companies.	
Estimated coal reserves (millions of tons):			
In place[2]	1,069[3]	([1])	
Recoverable	534		
Expected minimum mine life (years)	35	35	
Production rate (mty)	11	1	
Development schedule (months):			
Initiation to production	12	6	
Initiation to full production	120	12	
Mining method	Underground.	Underground.	
Ancillary facilities[4]	Powerlines.	None.	
	Waterline from Lake Powell.	None.	
	System to transport coal to market or an energy conversion system.	Road upgrading from mine to U.S. Highway 89 near Glen Canyon City.	
Requirements:			
Land surface (acres):			
Portal facilities	92	15	107
Coal preparation plantsite	1,549	0	1,549
Access[4]:			
Transportation	150	20[5]	150
Power	unknown	0	---
Total	1,791	35	1,806
Other:			
Water for mining (acre-feet/year)	3,050	50[6]	3,100
Water for increased population (acre-feet/year)[7]	4,320	180	4,500
Lime (rock dust)(tons/day)[8]	265	25	290
Personnel:			
Construction	700	---	700
Mine operation[9]	3,190	290	3,480

---

[1] No. 5 mine is within the same lease area as Nos. 1-4.

[2] Total leasehold reserve is 1,600 million tons. The 1,069 million tons is confined to the mine plan area.

[3] Include No. 5 mine.

[4] Preliminary plans that will require additional future environmental assesment following a company application for approval.

[5] Surface disturbance necessary if only No. 5 mine access is required. Nos. 1-4 access would provide access to No. 5.

[6] Based on average water requirement for mining 1 mty. Company has filed for 13.8 acre-feet of ground water per year.

[7] Task force estimate.

[8] Discussed in Kaiparowits EIS (BLM, 1976).

[9] 15 tons/manshift, 230 manshifts/year (includes support).

TABLE 2.--Changes in requirements for Kaiparowits Nos. 1-5 mine surface facilities

[Data are in acres]

Item	Original plans[1]		Change		Total	
	Area disturbed in construction	Area occupied permanently	Area disturbed in construction	Area occupied permanently	Area disturbed in construction	Area occupied permanently
Mine portals ----------	92	92	[2]+15	[2]+15	107	107
Preparation plant (washery) and silos--	50	17	--	--	50	17
Central administration complex (including permanent storage and water reservoir)-	50	50	--	--	50	50
Coarse refuse dump-----	550	550	--	--	550	550
Tailings and clear-water ponds----------	573	573	[3]-23	[3]-23	550	550
Sewage pond------------	60	60	--	--	60	60
Ventilation fans-------	4	4	--	--	4	4
Temporary coal storage area---------	75	--	--	--	75	--
Corridors (roads, conveyor, etc.)------	210	140	--	--	210	140
Main access road-------	150	150	--	--	150	150
Total----------------	1,814	1,636	-8	-8	1,806	1,628

[1] Discussed in the Kaiparowits EIS (BLM, 1976).

[2] Increased at Kaiparowits No. 5 mine.

[3] Reduced as a result of improved design.

B. PROPOSED ACTION

1975 Mine Plan

The following has been extracted dominantly from Mining and Reclamation Plans originally submitted in 1975 by Kaiser Engineers, and the Kaiparowits EIS (BLM, 1976).

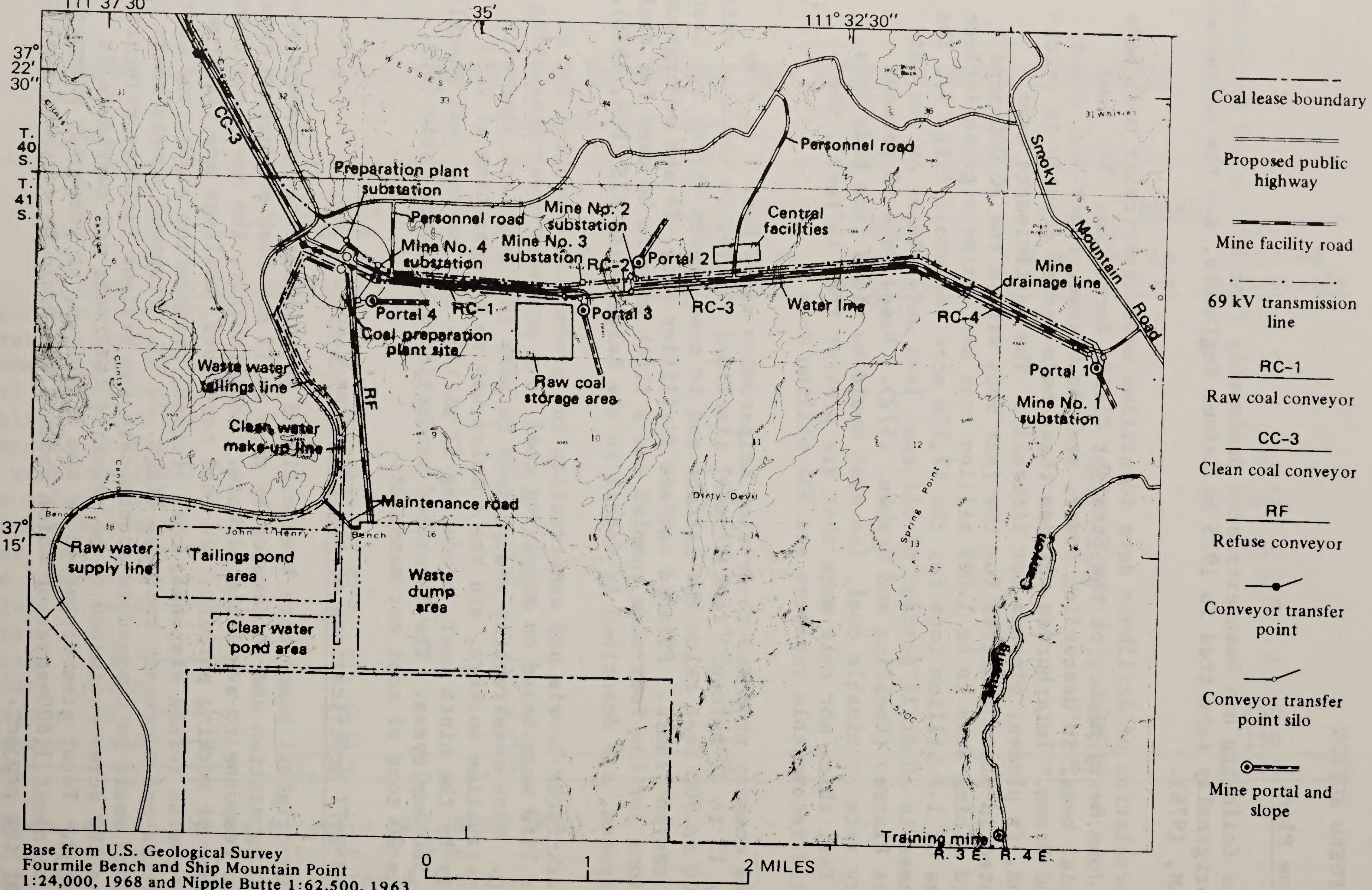
Correlation of drillhole data identifies seven lenticular coal beds in the John Henry Member of the Straight Cliffs Formation. The four commercial beds, in descending order, are the Orange, Upper Red, Lower Red, and Brown. Interburden between these beds varies greatly in thickness and, in places, pinches out laterally. The participants have calculated in-place reserves for the four beds within the 30,000-acre proposed mining area to be 1.069 billion tons and estimate gross inplace reserves of 1.6 billion tons for the 47,776 acre leasehold (fig. 1). The coal lease is about 21 percent of all coal land under lease on the Kaiparowits Plateau (Doelling and Graham, 1972). Based on a 50 percent recovery rate of minable coal, (no coal would be mined from beds less than 4 feet thick nor cuts made that are greater than 14 feet), the estimated recoverable reserves are 534 million tons.

The company proposed to develop Kaiparowits mines Nos. 1 to 4 by driving 15 to 30 percent "rock slopes" (inclined shafts) to the coal which lies 300 to 900 feet below the surface and in some places within 100 feet of the canyon floors. Planned surface facilities (fig. 2) and underground operations for the four-mine complex and a fifth mine to be used for training purposes, are described in detail in the Kaiparowits EIS (BLM, 1976).

Work-force levels and construction and production schedules for a 35-year life were based on supplying coal to a proposed power-generating station. Mine construction was planned to peak in the fourth year with 700 construction workers, and the complex was to be operating at full capacity by the ninth year, producing 12 million tons of raw coal annually with 2,560 employees. The described production work-force ratio (BLM, 1976) is 20 tons of coal per manshift.

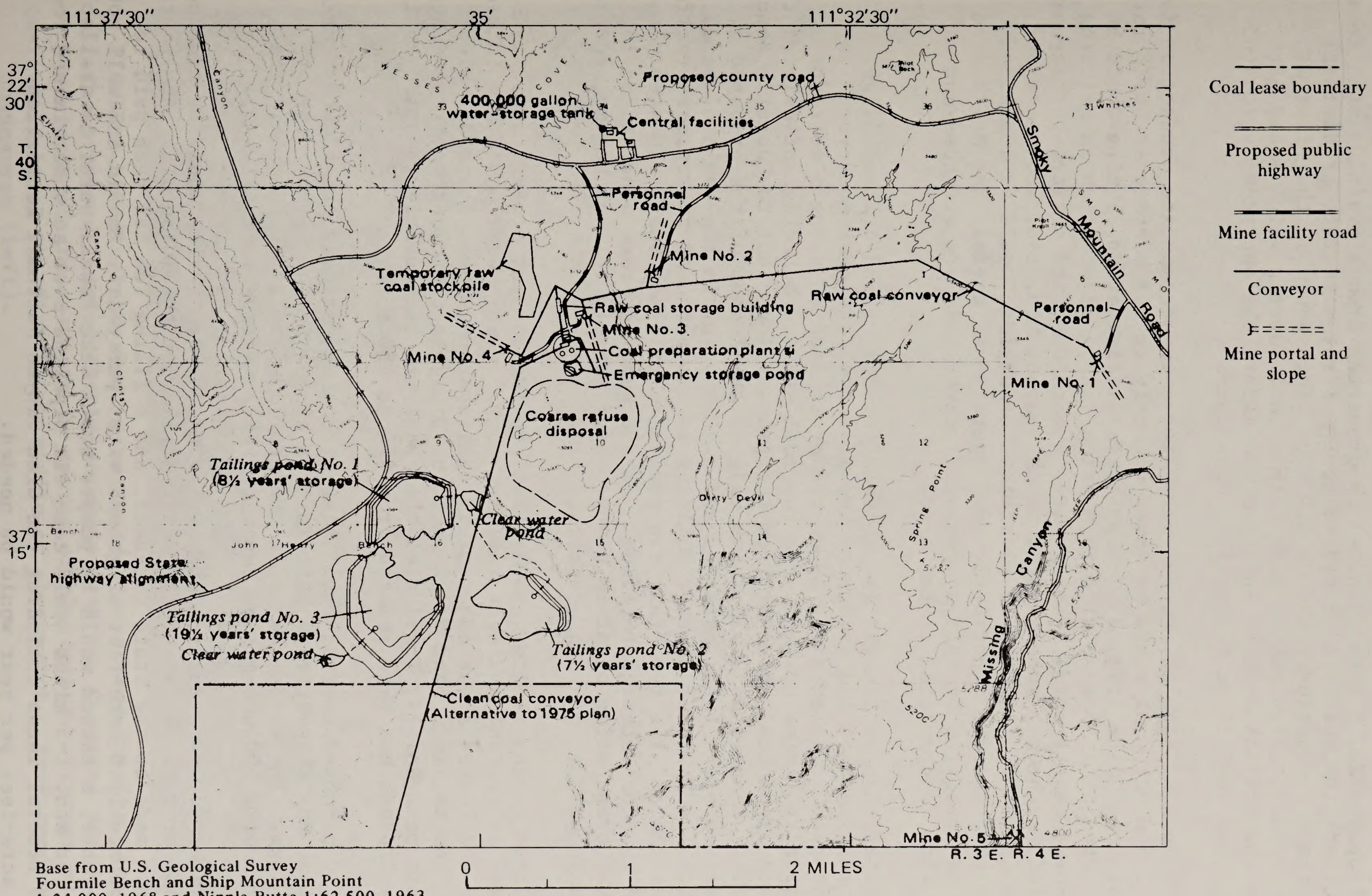
1976 and 1977 Modifications of the 1975 Mine Plan

The original plans have been modified to eliminate the proposed power-generating station and to develop as much as 12 mty coal production capacity in response to available markets. Additionally, the new plans change locations of working portals, raw coal conveyors, tailings and clear-water ponds, coarse refuse disposal, coal storage, preparation plant, and central facilities and necessary roadways (figs. 2, 3). Proposed access roads and corridors would be changed to accommodate the various facility relocations, but the 290 acres estimated to be required for roads and corridors is unchanged. Total area disturbed by the minesites, as presently planned, would be about 1,800 acres of which about 1,630 would be occupied over the life of the project.



Base from U.S. Geological Survey
Fourmile Bench and Ship Mountain Point
1:24,000, 1968 and Nipple Butte 1:62,500, 1963

FIGURE 2.--Map showing the original 1975 surface facilities plan of the Kaiparowits Coal Mining Project.



Base from U.S. Geological Survey
Fourmile Bench and Ship Mountain Point
1:24,000, 1968 and Nipple Butte 1:62,500, 1963

FIGURE 3.--Map showing modifications of the 1975 surface facilities plan of the Kaiparowits Coal Mining Project.

Proposed No. 5 mine (fig. 4) is converted from a training mine to a production mine and is intended to be the first mine into production. The maximum production would be 1.0 mty. This would be the first mine opened because entry can be made into a coal outcrop which would both reduce the initial expense and time and afford the opportunity to study underground conditions before full development.

The mining plan is changed very little to accommodate production from the No. 5 mine; coal would be moved directly to the surface at No. 5 rather than at No. 3 mine (fig. 3). Support facilities at No. 5 mine would be constructed on a 15-acre site in Missing Canyon adjacent to an existing unimproved county road. They include a bathhouse and office, parking area, shop and warehouse, supply yard, truck loadout bin, fan, and conveyor system (fig. 5). A portable electrical powerplant would be installed on the site to meet construction and operational needs. The No. 5 mine would be supported by this system until powerlines are extended and a trunk line is completed to the mine.

Other changes brought the portals for Nos. 3 and 4 mines (figs. 2, 3, 6) closer together and relocated the principal raw coal conveyor. The present plan utilizes a series of conveyors located along a corridor extending from mine no. 1 to the raw coal storage building and deletes the proposed clean coal conveyor from the preparation plant to Fourmile Bench (fig. 2). Changes have also been made in the layout of the proposed coal preparation plant (coal crushing and washery) and in the raw coal handling facility. A raw coal storage building is now proposed to replace transfer point silos and the temporary raw coal stockpile has been relocated closer to the raw coal storage building. An emergency storage pond, to be located near the preparation plant is now proposed, should it ever become necessary to empty the coal cleaning vessels.

Three fenced tailings ponds that provide 35-year storage capacity are proposed to replace a single tailings pond. Clear-water ponds are located within the fenced areas adjacent to tailings ponds Nos. 1 and 3. Clear water from tailings pond No. 2 would be piped to the clear-water pond near tailings pond No. 1. Total area that would be permanently occupied by the proposed ponds has been reduced from 573 to 550 acres.

The proposed central facilities site that includes the administration, training, and shop-storage buildings is closer to the main center of activities. The major change in the central facilities layout is the addition of a 400,000-gallon capacity water storage tank (fig. 3).

Water for construction and mining at the No. 5 mine would be trucked from one or more of three test wells drilled on the leasehold. Application has been made to the State Engineer, and a filing fee has been paid to appropriate 13.8 acre-feet of ground water per year. Should one well not be adequate, a second would be pumped until Lake Powell water is available. Water for Nos. 1-5 mines would come via pipeline over an undetermined route across federal lands including the Glen Canyon National Recreation area; 3,100 acre-feet per year would be needed.

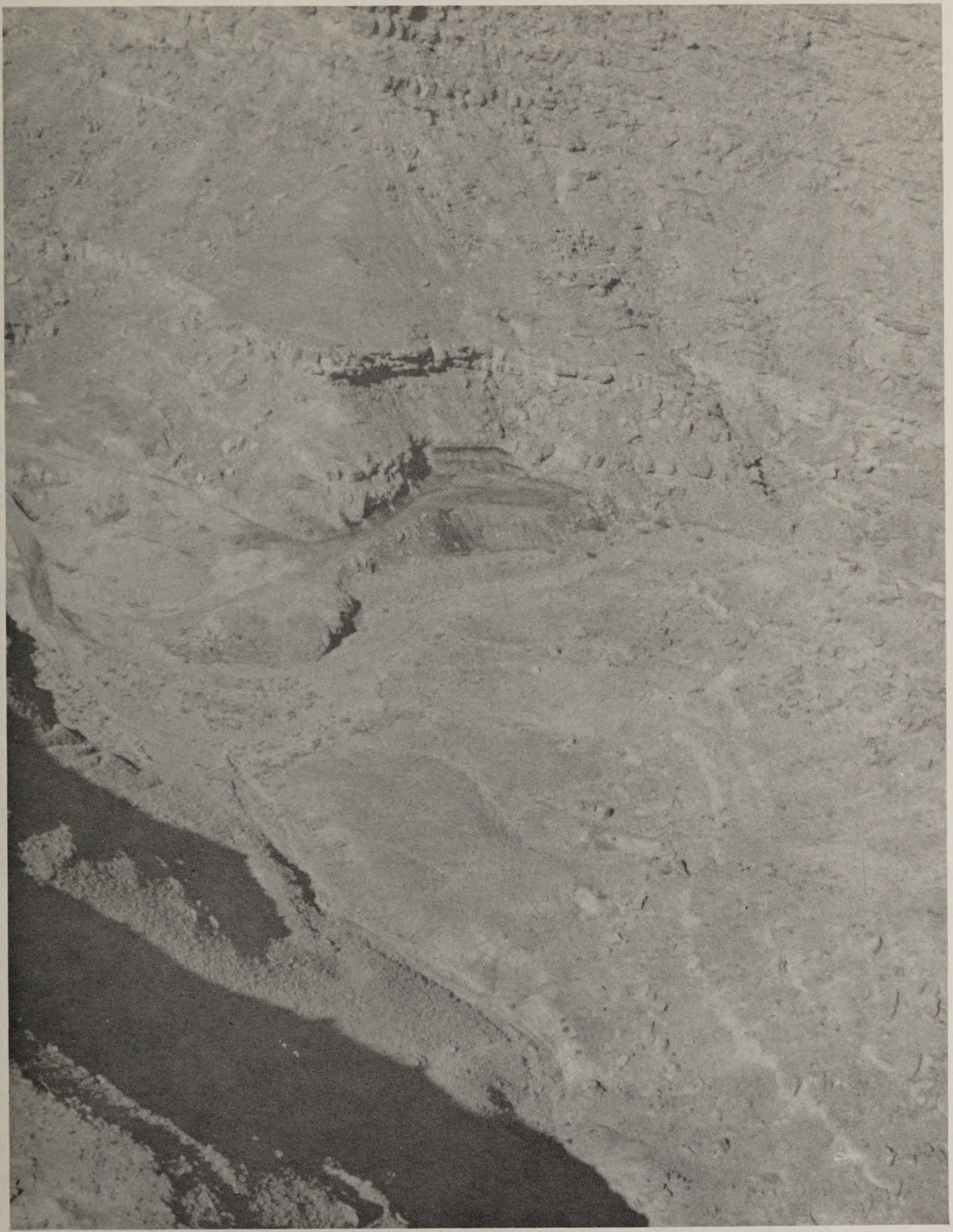


FIGURE 4.--Photograph showing westward view across Missing Canyon at the proposed site of the Kaiparowits mine No. 5 portal area. Entry would be at the workings in center of photograph. Storage buildings would be on the flat below middle of photograph. Haul road would go downcanyon (left).

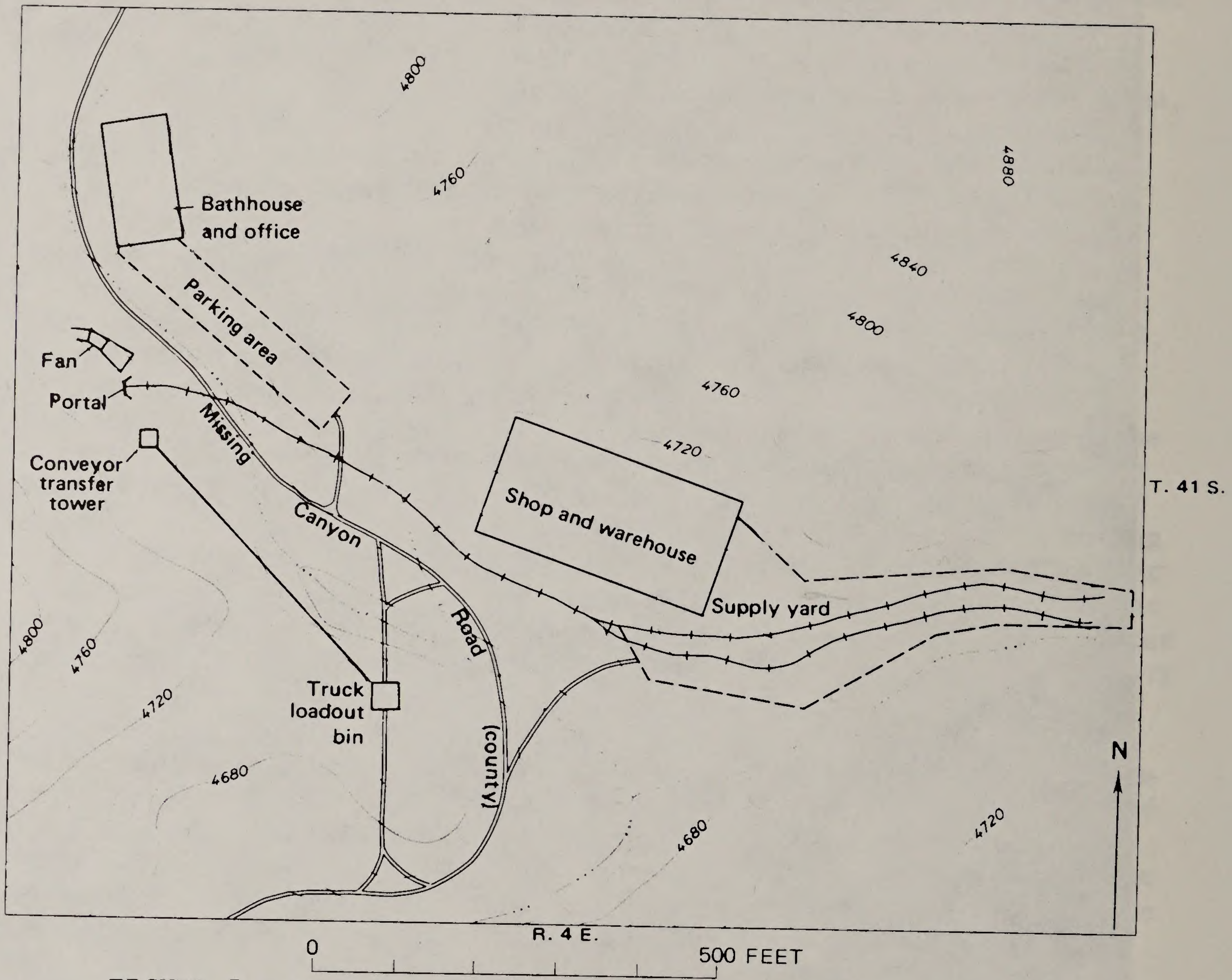


FIGURE 5.--Map showing proposed surface facilities at the Kaiparowits No. 5 minesite.

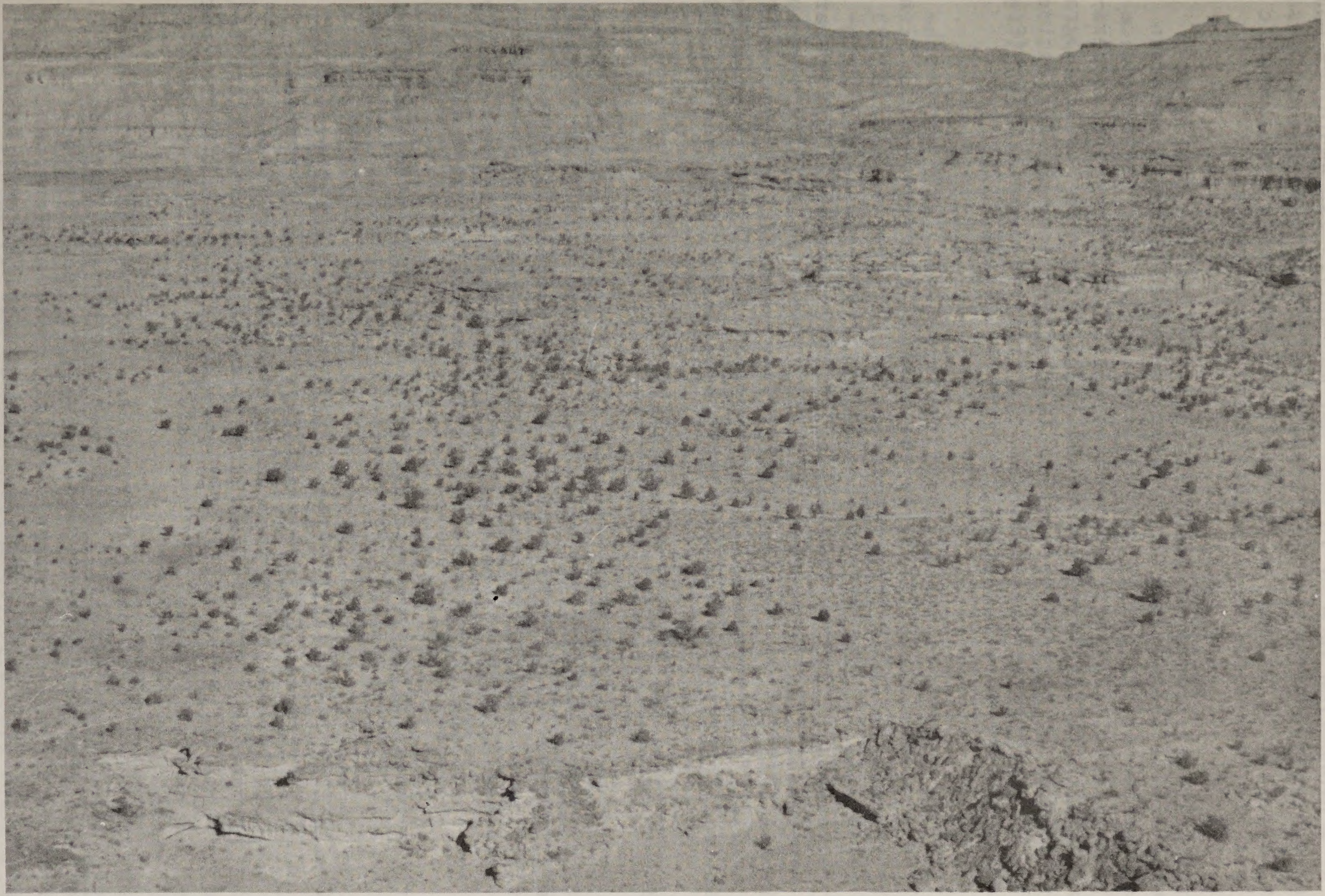


FIGURE 6.--Panoramic view of proposed sites for Kaiparowits Nos. 3 and 4 mines preparation plant. The plant would be above and left of center. Tailings ponds and waste dump would be in foreground. Mine No. 4 would be in the flat in the northwest corner. No. 3 mine would be below the rock ledge near the road at the right side of photograph.

The company estimates a work force of 200 to 250 employees to produce 1.0 mty. At a production rate of 15 tons per man-shift, 290 employees would be required to produce 1.0 mty. This includes both mine and support personnel. This latter ratio is used as the basis for evaluating socioeconomic and other work-force-related impacts described in this report.

The participants propose to haul the coal from the No. 5 mine to U.S. Highway 89 near Glen Canyon City, using the existing Smoky Mountain and Missing County variant county road (fig. 1). This road is inadequate for coal haul traffic. However, the participants plan to provide cooperation and assistance to the Kane County Commission to help the county upgrade the road including the portion through the Glen Canyon National Recreation Area (NRA). An alternative road alinement has received consideration (fig. 7; see also chapter VIII, Require Modification of the Mining Plan).

That 12-mile segment of the proposed haul road that falls within the NRA coincides with or closely parallels the proposed alinement of the Glen Canyon City to Bullfrog Basin road authorized by section 8 of P.L. 92-593 (86 Stat. 1311) as a "...scenic, low-speed road..." to provide for circulation of recreational traffic. The National Park Service (NPS) has prepared a General Management Plan, Wilderness Proposal, Road Study Alternatives and DES for the NRA (DES 77-28). At the present time, upgrading of the road for coal haul traffic is in unresolved dispute possibly involving the proponents, the El Paso Coal Company, the State of Utah, Kane County, BLM, and the NPS.

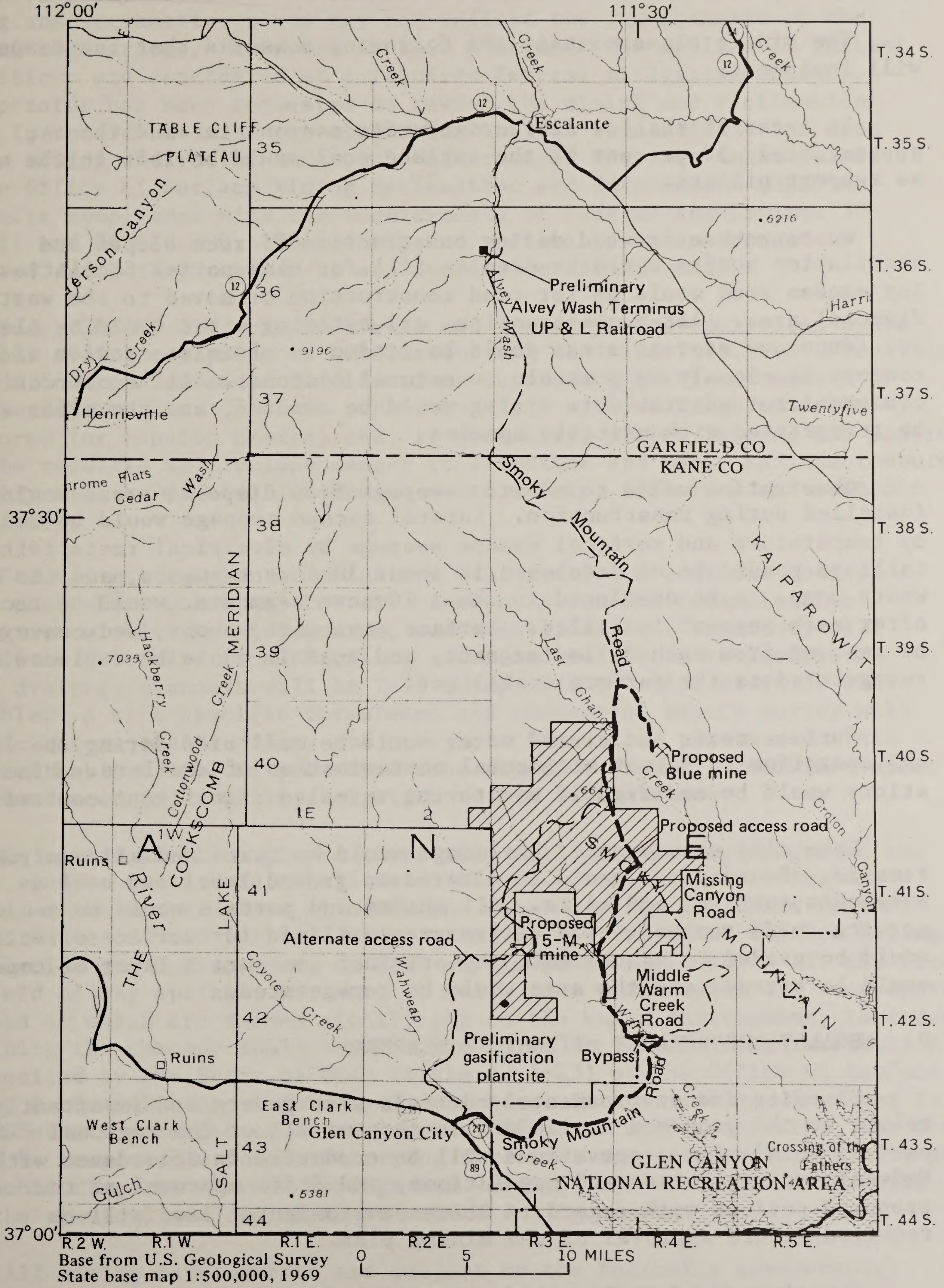
Associated Activities Not Pending Federal Action

A 41-mile-long transportation corridor roughly parallel to the Smoky Mountain road is proposed from the mines to a proposed Utah Power & Light Co. railroad terminus at Alvey Wash (fig. 7). The corridor would be sufficiently wide to accommodate any of several transportation modes, including railroad, truck-haul, belt conveyor, or slurry pipeline. Neither the exact route nor transportation mode was defined in the proposal.

Powerline routes to the mining complex are described in the Kaiparowits Project EIS.

A 170-mile long 24-inch coal-slurry pipeline requiring about 7,000 acre-feet of water per year and other pipelines and transport schemes have been proposed by the participants as an alternative means of transporting as much as 9 mty of clean coal from the preparation plant to a railroad terminus in the vicinity of Flagstaff, Ariz., or elsewhere (part 1, fig. I-2 and chapter VIII).

The proponents have published a brochure, "Utah coal for Southwest gas markets," which they "hope will stimulate interest and generate discussions" for producing high-Btu pipeline-quality gas from coal to be mined from the Kaiparowits Plateau. The gasification plant would also be located on the plateau (fig. 7). No plans or proposals have been submitted for Federal action and major anticipated environmental impacts are described in the regional EIS part 1.



Base from U.S. Geological Survey
State base map 1:500,000, 1969

FIGURE 7.--Map showing preliminary proposals related to the Kaiparowits Nos. 1-5 mines.

C. ENVIRONMENTAL PROTECTION AND RECLAMATION

The mining plans contain the following measures that the company will implement.

In areas of shallow overburden under canyon rims and floors, approximately 50 percent of the inplace coal would be left in the mines as support pillars.

Waste rock excavated during construction of rock slopes and ventilation shafts would be used as fill for mine portal facilities. Any excess rock would be for road construction or moved to the waste disposal area. After construction, all building sites would be cleaned up; temporary storage areas would be graded to minimize erosion and to conform as closely as possible to natural contours. All construction equipment not adaptable to mining would be removed, and the areas would be revegetated with suitable species.

Observation wells to monitor seepage from disposal areas would be installed during construction. Lateral escape seepage would be monitored by temperature and vertical escape seepage by electrical resistivity. The tailings ponds, to be developed in about 30-acre segments, and the coarse waste dump, to be developed in about 10-acre segments, would be reclaimed after each segment is filled. Surface equipment, pumps, and conveyors would be removed from each filled segment, and topsoil would be replaced and revegetated as the surface stabilizes.

Surface water and ground water would be monitored during the life of the operation to detect accidental contamination of aquifers. Mine operations would be modified if monitoring revealed significant contamination.

Upon mine abandonment, buildings would be razed and all equipment removed. Foundations would be cleared to ground level and used as fill for basements, shafts, and adits. All shafts and portals would be sealed and service roads removed. The entire area utilized for surface structures would be graded to approximate the original contour; a layer of topsoil would be spread, and the area would be revegetated.

D. LEGALLY ENFORCEABLE MITIGATING MEASURES

Planning and environmental controls that govern and importantly relate to the proposed action are in chapter III of the regional EIS part 1. Total mining operations will be conducted in accordance with Federal and State laws and regulations, and State approval of the proposed actions with regard to State environmental laws will be required before approval of the mining plan.

The mining and reclamation plans included in this statement were submitted for review prior to the promulgation of initial regulations (30 CFR 700) required under Section 502 and 523 of the Surface Mining Control and Reclamation Act (SMCRA) of 1977 (P.L. 95-87) and have not been officially reviewed for compliance therewith. Therefore, the mining and reclamation plans may not reflect the requirements of the initial regulations. However, in this statement the applicable initial regulations are considered as a required Federal mitigating measure. The operator has been requested to revise the mining and reclamation plans in accordance with the applicable initial regulations. As soon as the mining and reclamation plans are revised they are to be submitted to the Office of Surface Mining Reclamation and Enforcement (OSM) to determine compliance with the requirements of Federal regulations 30 CFR 211 and 30 CFR 700. The mining and reclamation plans cannot be approved until they conform to all applicable requirements.

Under 30 CFR 211, the USGS will add mining-plan stipulations where longwall mining equipment is used, requiring the mine face, where feasible, to be alined and advanced in directions to produce the least amount of surface deformation. Surface areas above all mine workings will be monitored for tension cracks, and, if necessary, proper fencing and posting will be required to preclude danger to livestock and man. Maximum resource recovery will be required, based on sound safety, technical and economic principles.

Federal mining plan stipulations will require a corridor concept to be used where practical for all transportation and communication facilities within the mining area, and a detailed soil inventory will be made to determine final facility sites and to aid in reclamation. Major drainage channels will be left unimpaired by all facilities where possible. A site-specific threatened and endangered plants survey will be made before construction, and pertinent identified plants and their critical habitat will be protected from negative impact. Reclaimed areas will be fenced may require irrigation to aid revegetation.

No wastes shall be placed where they will pollute any waters of the State, and no waste water shall be discharged or allowed to enter any waters of the State unless it meets the water quality standards required by the State of Utah (title 73-14-1 et al.), the Office of Surface Mining Reclamation and Enforcement, or EPA, whichever is applicable. If the flow or yield of any springs, streams, or wells from which water has been appropriated or which are deemed significant to the human environment, is reduced by mining the company shall replace the water in kind or make restitution, as required by the State of Utah (title 73-3-23) or the Office of Surface Mining Reclamation and Enforcement, whichever is applicable. In order to have the information needed to determine the effect of mining on water, the company shall be responsible for inventorying the water resources before mining and for monitoring the flow of springs and streams, the water level in wells, and the chemical quality of these waters during mining.

All mining developments are subject to the following governmental stipulations regulating the development and use of natural resources. The Management Framework Plan published by BLM for the Paria Planning units 1971-72 stipulates that vegetative manipulation must provide surface protection assuring maintenance of watershed conditions and overall land surface quality; assure environmental protection of resource values; arrange for conservation of coal resources and proper reclamation of proposed mining operations. The mineral objectives of this Management Framework Plan are to make coal available on a managed controlled basis consistent with county, State, and Federal planning, and the National Environmental Policy Act.

The master plan for the nearby Glen Canyon NRA (fig. 1) stipulates preservation of scenic, scientific, and historic features contributing to public enjoyment of the area. The plan also requires maintaining high water quality in all bodies and sources and perpetuance of the natural flow of water.

The Kaiparowits Nos. 1-5 mines proponents and the appropriate Federal authorizing office will comply with Section 106 of the National Preservation Act of 1966 (USC Section 470f, as amended, 90 Stat. 1320) and the Advisory Council's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800) prior to approval of any undertaking which will affect cultural properties included in or eligible for inclusion in the National Register of Historic Places.

The Bureau of Land Management, Utah State Director, and the Utah State Historic Preservation Officer have entered into a memorandum of understanding which sets forth measures the Bureau would undertake in regard to the protection of cultural resources on public lands. The principal point in the agreement is that the project proponents will be required to have an intensive survey made for all areas that will be disturbed. If any sites are found to be of National Register significance, the project would either have to be altered so as to avoid the site(s) or provide for the preservation of data from the site(s). A cooperative agreement that has the same effect exists between the U.S.G.S. and BLM which provides for "Protection of Cultural Resources Related to Onshore Mineral Lease Operations Exclusive of Oil, Gas, Geothermal, and Oil Shale."

The revised Utah State Antiquities Act (1977) provides for the preservation and (or) protection of paleontological values on State land. Discovery of such values on Federal land will be brought to the attention of the federal authorities having management responsibility for the Mono Power Co. et al. leases and their recommendations followed.

The operator shall employ the best management practices to reduce fugitive dust regardless of predicted concentrations during operation. Thus the mining plan and the Department's approval thereof will use an appropriate combination of the following fugitive dust controls:

- Pavement or equivalent stabilization of all haul roads used or in place for more than one year. Haul roads are the roads used for work force access and (or) coal haul.

- Treatment with semi-permanent dust suppressant of all haul roads used or in place for less than one year and for more than two months.

- Watering of all other roads in advance of and during use whenever sufficient unstabilized material is present to cause excessive fugitive dust.

- Reduction of fugitive dust at all coal dump (truck to crusher) locations through use of negative pressure bag house or equivalent methods. Inclusion of conveyor and transfer point covering and spraying and the use of coal loadout silos.

CHAPTER II

DESCRIPTION OF THE EXISTING ENVIRONMENT

Only a summary description of the existing environment is presented in this statement. A detailed description is given in chapter II of the Final Kaiparowits Project EIS.

A. NATURAL ENVIRONMENT

1. Climate

The general climate is described in chapter II of Part 1. Average monthly temperature at the minesite ranges from about 30°F in January to more than 70°F in July and August. Temperatures range from about 0° to 100°F. Annual precipitation averages 8 inches per year and may range from less than 3 inches to more than 15 inches. The 100-year 6-hour precipitation is 2.4 inches. Evaporation is estimated to be 70 to 80 inches per year, based on records at Page and Wahweap, Ariz.

2. Land

a. Land surface

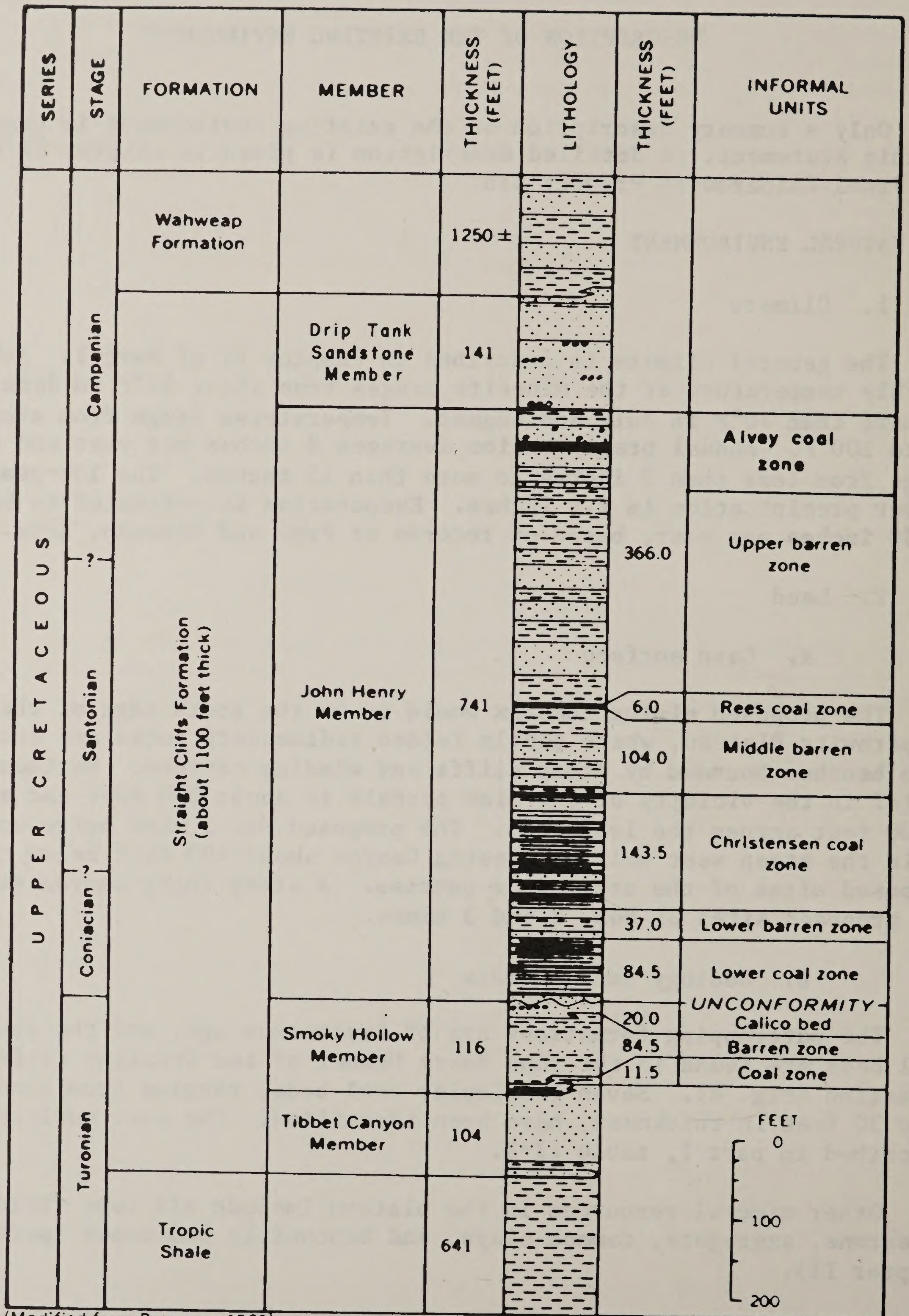
The proposed mining complex would be on the south edge of the Kaiparowits Plateau, where gently folded sedimentary rocks are eroded into benches bounded by steep cliffs and winding canyons. Maximum relief in the vicinity of the mine portals is about 800 feet and about 1,500 feet across the leasehold. The proposed No. 5 mine entry would be in the steep west wall of Missing Canyon about 400 feet below the proposed sites of the other four entries. A steep rocky canyon separates the proposed sites of Nos. 2 and 3 mines.

b. Geology and minerals

The outcropping formations are of Cretaceous age, and the economic coal beds are found in the John Henry Member of the Straight Cliffs Formation (fig. 8). Seven lenticular coal beds, ranging from about 4 to 30 feet in thickness, have been identified. The coal quality is described in part 1, table II-1.

Other mineral resources in the plateau include oil (one field), limestone, aggregate, common clays, and bentonitic mudstones (part 1, chapter II).

Little is known about the paleontologic resources in the area of the Kaiparowits Nos. 1-5 minesites. Paleontologic resources found on Nipple and Fourmile Benches are discussed in part 1, chapter II.



(Modified from Peterson, 1969)

FIGURE 8.--Composite columnar section of the coal-bearing Straight Cliffs Formation.

c. Soils

The soils in the area have formed from sandstone and shale yielding sandy to clayey textures. Lack of moisture is a major constraint to soil productivity. Erosion hazard is moderately high owing to the sparse vegetation, infrequent but intense rainstorms, and strong winds. Revegetation potential is low on all these soils because of the lack of moisture and the high salt content, especially on the clayey soils.

Proposed Nos. 1, 2, and 3 mines would be located on a plateau where soils range from less than 1 to about 5 feet in depth. Surface soils are commonly sandy loam, and subsoils are loam in texture. Carbonate accumulates in the subsoil. Sandstone outcrops are common. There are few limitations for construction at these sites. Between minesites Nos. 2 and 3 is a steep rocky canyon where soil is sparse.

Mine No. 4, the coal preparation plant, waste dump, and tailings ponds would be in an area that ranges from clayey soils on shale to loamy and sandy soils over sandstone. The soils on shale are grayish brown, high in soluble salts, clayey, support sparse vegetation, and are actively being eroded. The soils on sandstone are similar to those described at Nos. 1, 2, and 3 minesites.

Soils at No. 5 minesite are highly variable, but, in general, they are very stony, shallow to moderately deep and medium textured. Some clayey soils occur locally where shale bedrock is present. The amount of alluvial soils along the bottom is minimal. Erosion hazard is moderate.

The transportation and utility systems would be located on a variety of soils similar to those discussed above.

3. Water

a. Water supply

1) Surface water

The Colorado River and Lake Powell are the only significant sources of surface water in the Kaiparowits Plateau area. The proposed mines underlie parts of the Warm Creek and Last Chance Creek watersheds, which drain to Lake Powell, about 15 miles distant. Streams are ephemeral and flow mainly in response to rainfall or snowmelt. Spring flow is estimated to be about 160 acre-feet per year (BLM, 1976). The flow is used by livestock and wildlife.

2) Ground water

Ground water occurs in virtually all the rock units underlying the lease area. Because of deeply incised canyons the upper waterbearing units are partly void of water near cliff faces. Ground water may be perched, or impeded from deeper infiltration, by one or more layers of rock having relatively low permeability. Well yields are small to moderate (5 to 500 gal/min) from thin sandstones to large (50 to 1,500 gal/min) from massive sandstones. The quantity of water available to individual wells varies with depth, formation, and location. Data collected during core drilling indicate that the principal coal beds are above the regional water table, but one or more saturated sandstone strata may occur above or within these beds.

The perched saturated strata are chiefly composed of fine- to medium-grained sandstone that yield water slowly (generally from less than 1 to about 20 gal/min to springs and small-diameter core holes). These saturated sandstones discharge naturally to alluvium and small streams in the bottoms of larger stream channels. Alluvium receiving flow from these sandstones is highly permeable and may yield water readily to wells, sumps, or infiltration galleries. In most places, however, this alluvium is too thin and restricted in extent to support large continuous withdrawals of water.

The most extensive and productive aquifer is the Navajo Sandstone where that formation extends beneath the regional water table. The Navajo lies at depths of 2,000 to 4,000 feet beneath Fourmile and Nipple Benches and has not been tapped by wells in those areas. In the lower Wahweap Creek area south-southwest of the lease (fig. 1), where the formation is exposed or lies just below the surface, several wells have been drilled that reportedly yield several hundred to more than 1,000 gal/min (BLM, 1976, p. II-139).

Other productive saturated sandstones are contained in the Drip Tank Sandstone Member and the underlying John Henry Member of the Straight Cliffs Formation. These saturated sandstone beds are at or near the surface in part of the lease area, and expected yields to wells are less than about 150 gal/min. The overlying Wahweap Formation may yield smaller amounts to wells.

The shallower (upper) saturated sandstones are recharged by downward infiltration of precipitation in the vicinity of the lease. Although the amount of water moving downward through a unit area of the less permeable strata is small (probably less than 5 percent of annual precipitation), the total area involved is large and the amount of water infiltrating is about 20 acre-feet or less per year per square mile. Data are insufficient but head differences indicate that the deeper saturated beds are recharged some distance from the lease area, probably from the northwest. Topography and geologic structure seem to control ground-water flow in the upper saturated sandstones. Local direction of ground-water movement is problematical, but the regional flow is south and southeastward.

b. Water quality

Water in the Colorado River at Lees Ferry (fig. I-2, part 1) contains about 500 mg/L dissolved solids. Water in Lake Powell contains 550 to 815 mg/L dissolved solids (Bureau of Reclamation, written communication, 1975). Water in Warm and Last Chance Creeks contains 3,500 to 5,000 mg/L dissolved solids, which makes it barely suitable for wildlife and livestock use. Concentrations of heavy metals and trace elements such as cadmium, lead, manganese, and selenium may exceed recommended limits for public supply (EPA, 1973) according to recent unpublished data collected under the 208 Water Quality Project for the five-county area.

4. Air

Particulates are the only pollutants of potential concern as a result of the mining operations (AeroVironment, 1977). Other pollutants such as sulfur dioxide, nitrogen oxides, carbon monoxide, and photochemical oxidants would be significantly below all standards. National ambient air quality standards for particulates are shown in part 1, table III-1.

Monitoring of total suspended particulates (TSP) in the area is relatively extensive compared to that for many other pollutants for which national standards have been promulgated. Measurements have been made around potential and existing powerplant sites by private consultants and in other areas by the Environmental Health Services Branch of the Utah Division of Health. Total suspended particulate data from 10 stations of which five were monitored during 1975, shows that maximum 24-hour concentrations range from 70 to 742 $\mu g/m^3$ and the annual average is 26 $\mu g/m^3$ (regional EIS, part 1, table II-13).

Medium visibilities in non-urban areas of the Southwest are 65 to 80 miles, according to Trijonis (1978). Visibility measurements made at Cedar Mountain, east of Castle Dale and southeast of Price, Utah (fig. I-1) have monthly averages that range from 54 miles in April, 1977 to 94 miles in November and December, 1976 (Pueschel and others, 1978). Values of visual range were derived from light scattering measurements made at Alton, Utah (fig. I-1) during the period February, 1976 to June, 1977 (Graham and Hovind, 1977). The average calculated visual range was 56 miles and daily averages ranged from 22 miles to 86 miles.

5. Vegetation

The final Kaiparowits EIS (BLM, 1976) adequately covers vegetative aspects for Nos. 1-4 mines and the coal preparation plantsites (figs. 6, 9, 10). The area involved is described as "predominantly salt brush and mixed desert shrub vegetation with sparse ground cover."

No. 5 mine is in a valley bottom and a sidehill in the Missing Canyon drainage (figs. 3, 4, 5). Vegetative cover is sparse and is mainly Desert Shrub type (part 1, chapter II). The same type covers the proposed access route and the proposed preparation plantsite.

No plants proposed for threatened or endangered status in the Federal Register were located by Welsh (1977). However, the National Park Service lists two critical species that may be found in the area (NPS, 1977). The two species are *Astragalus malaioides* (endangered) and *Astragalus striatiflorus* (threatened). These plants shall not be negatively impacted (chapter I, Legally Enforceable Mitigating Measures).

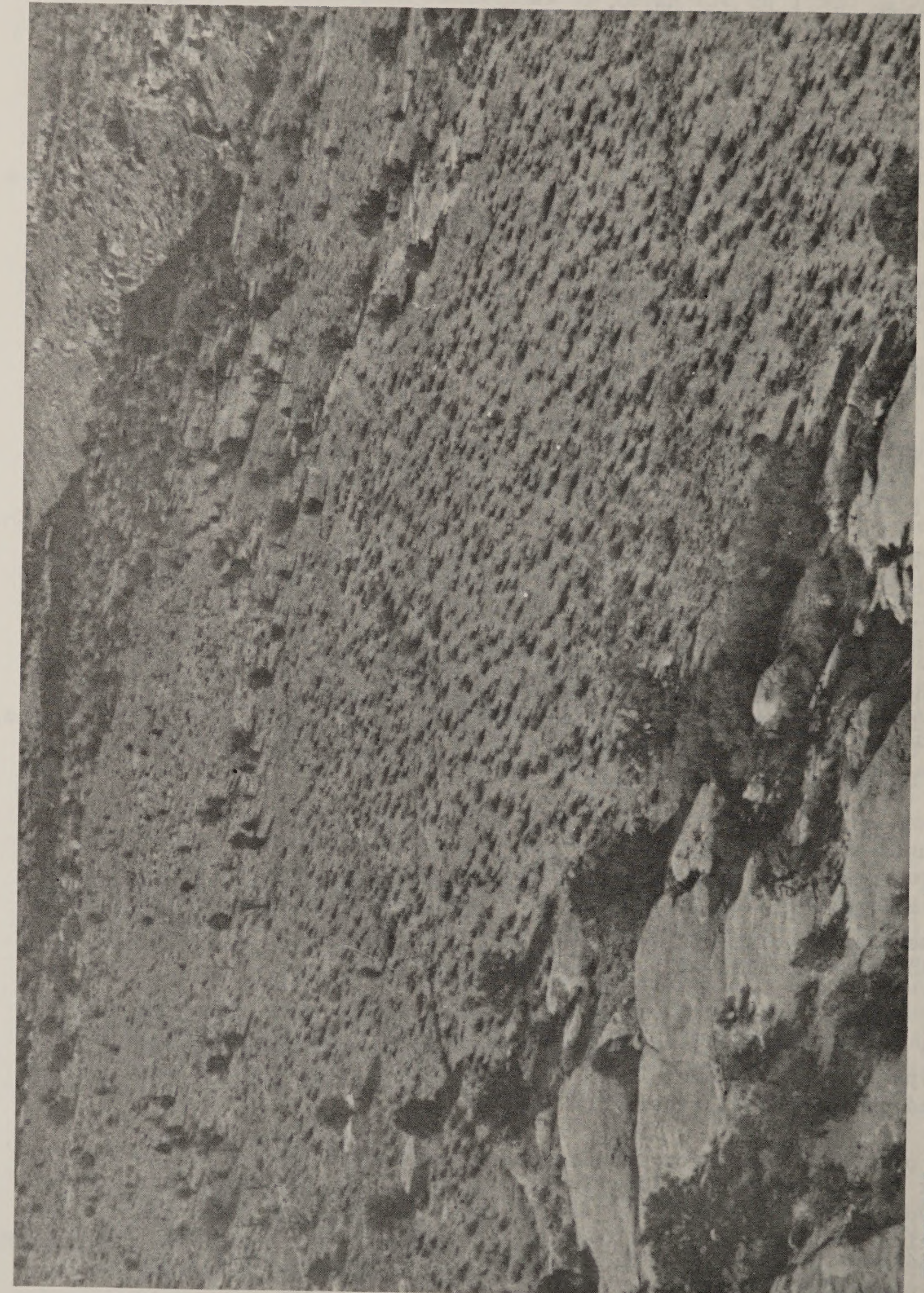


FIGURE 9.--Photograph looking southward toward the head of Missing Canyon at the proposed Kaiparowits No. 1 mine portal area. The entry would be below the massive rock area in the opening ringed by trees. The main haul conveyor would exit on the right side of the photograph.

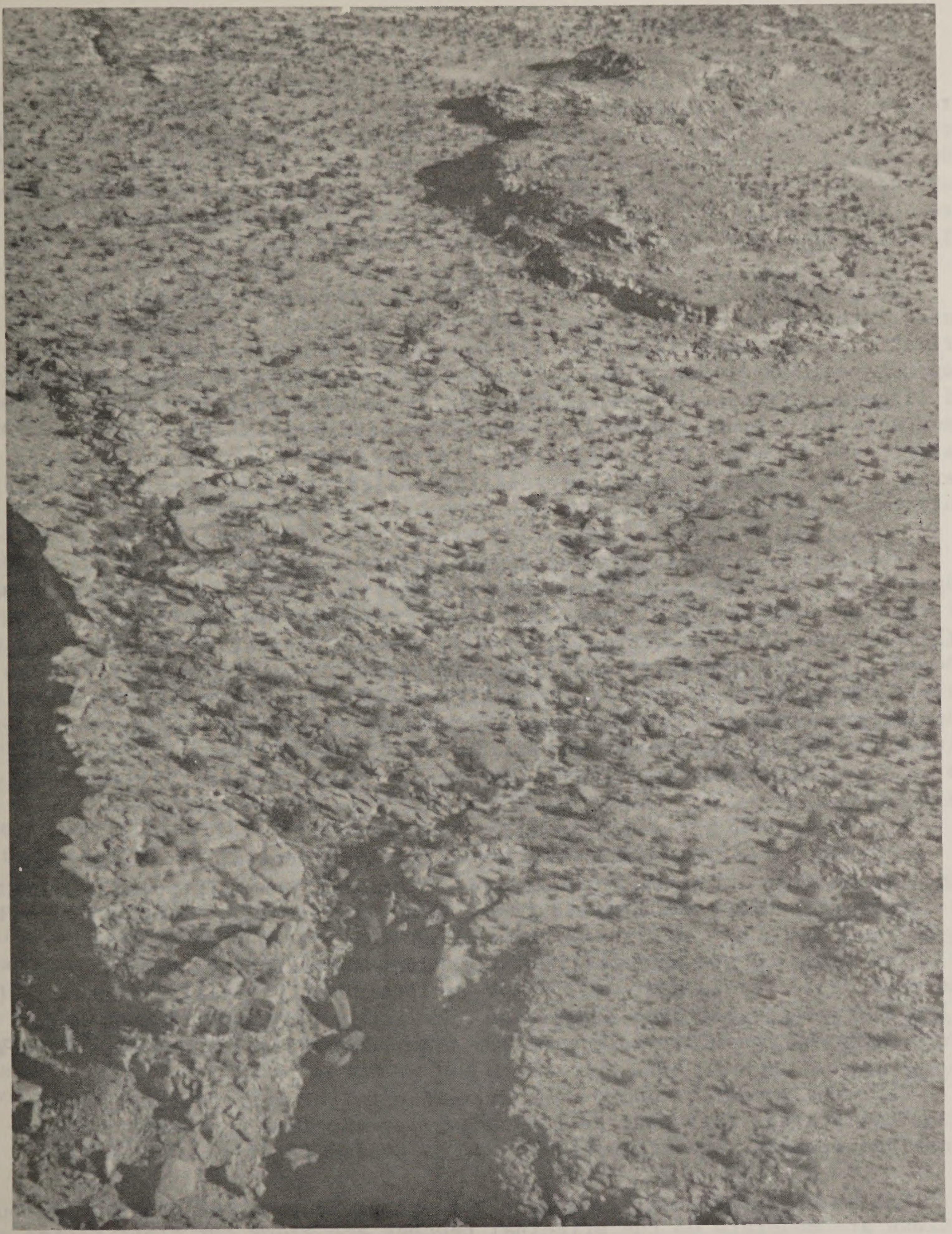


FIGURE 10.--Photograph looking northward at the Kaiparowits No. 2 mine portal area. The entry would be just above center of the photograph. The main haul conveyor would cross the photograph just below the elongated rock mound to the upper right corner.

6. Wildlife and Fisheries

Wildlife of the Kaiparowits Plateau is diverse but sparse. Deer, pronghorn antelope, mountain lion, coyotes, foxes, and bobcats are the principal large mammals. Mule deer is the principal big game animal. Over 200 species of birds, 30 species of small mammals and 31 species of reptiles and amphibians occur throughout the plateau. Desert bighorn inhabited the area historically, and the State of Utah plans their reintroduction on Fiftymile Mountain, 30 miles east of the proposed mines.

Kaiparowits Plateau is devoid of fishery habitat. However, its intermittent streams drain into Lake Powell (fig. 1). Lake Powell is primarily a warm water habitat, although cold, deep water near the dam supports rainbow trout. The reservoir supports excellent populations of largemouth bass, walleye, crappie, bluegill, and catfish. Striped bass were introduced and seem to be making excellent growth. Some larger game fish in Lake Powell have a mercury level exceeding 500 parts per billion. This mercury apparently comes largely from natural sources throughout the watershed.

The area is in Utah deer herd unit 60B, open during the regular hunting season. The herd is of modest size, compared with the major deer herds of Utah. A 1964 big game range inventory report by the Utah Division of Wildlife Resources classifies the pinyon-juniper habitat of Fourmile Bench and adjacent benches of similar elevation as winter range for deer. More recent observations by a team from Brigham Young University reveal a small population that occupies the bench tops in the spring but that spends the winter and summer in canyons and breaks below Fourmile Bench. This area is in a climate zone where summer and winter ranges are not always clearly defined.

Antelope were eliminated many years ago by uncontrolled hunting and competition from introduced livestock. The animal was reintroduced recently by the State on East Clark Bench (fig. 1) southwest of the proposed mine area.

The range of the mountain lion coincides approximately with that of the mule deer; the largest population is located on Fiftymile Mountain, 30 miles east of the proposed minesites. The inaccessibility of this high bench provides considerable protection from hunters, and other disturbances.

Mourning doves are common summer residents throughout most of the Kaiparowits area. They nest in pinyon-juniper woodland, cottonwood trees along the streams, and occasionally on the ground.

The desert cottontail is common throughout much of the plateau. Populations are moderate on the principal benches and along the flood plains of perennial streams, particularly Cottonwood Creek.

The deep waters of Lake Powell do not provide very productive habitat for waterfowl. Numerous species use the reservoir for resting during spring and fall migration and a few ducks remain all winter. Most waterfowl habitat at Lake Powell is in coves.

Rocky cliffs and ledges of the many steep-walled canyons in the vicinity provide excellent nesting sites for raptors. This, combined with diverse populations of small mammals, seclusion, and relatively little human disturbance, makes much of the Kaiparowits area productive habitat for several birds of prey. Golden eagles are common year-round residents. The permanent nesting population is joined in the winter by migrants from farther north. The endangered bald eagle is an uncommon winter resident. Other birds of prey common to the area include the ferruginous, rough-legged, red-tailed and sparrow hawks, the prairie falcon, and several species of owl. The peregrine falcon, also an endangered species, is a transient.

Resident populations of eagles, hawks, owls, and vultures are relatively stable at present. Some of the major causes of mortalities, such as collisions with powerlines and vehicles and illegal shooting, are largely absent in the Kaiparowits area.

Coyotes, bobcats, gray foxes, and badgers are the principal nongame carnivores. Populations are relatively stable. However, a recently increased market price for predator pelts, especially for that of the bobcat, has resulted in an increase in hunting and trapping pressure. Nonetheless, some parts of the impact area are so remote that predator populations have not been significantly affected.

The harsh, arid terrain supports a surprisingly diverse population of small mammals. All small mammal populations are subject to drastic short-term fluctuations with changes in weather, food supply, predation, and disease. However, no long-term population trends are known.

The small mammals are adaptable to a broad range of conditions. All the small rodents are capable of going without water for long periods. Water requirements are satisfied with moisture from succulent vegetation and insects in the diet. Some species can synthesize water from dry food. Thus, water supply is not normally a crucial survival factor. These animals occupy essentially the same habitat year round. Shelter and hiding places are plentiful in the rocky, rugged terrain.

Bats in the area feed almost exclusively on insects caught in flight. Streamside and lakeshore habitat are important sources of night-flying insects. Bats find resting places mainly in the rock crevices of the many steep canyon walls.

B. CULTURAL ENVIRONMENT AND LAND USE

1. Lands

All land in current leaseholdings is owned and administered by State or Federal agencies (fig. 1). BLM governs surface and mineral rights on 40,277 acres. The State administers surface and mineral rights on 7,499 acres.

Land uses include 14 grazing allotments, recreational activities, and wildlife habitat. No industrial developments are within the leased properties. Access includes 12 graded roads and 2 foot trails. Water improvements include one reservoir and two wells.

Kane County zoning ordinances dated October 13, 1975, permit coal mining on the proposed mining area.

2. Agriculture, Range, and Timber

The final Kaiparowits EIS (BLM, 1976) states that "cattle and big game compete for limited forage." Further, water sources are crucial to the use of the range by these animals.

Cattle winter graze the proposed sites. The sites supply about 40 AUM's grazing per year, of which about 2 are supplied by the proposed No. 5 minesite and its access road.

3. Socioeconomics

Population immediately nearby is approximately 1,500 to 1,700. The area is rural, and Kanab, about 55 miles west of Glen Canyon City (fig. 1), is the nearest large Utah community. Nearby Utah communities most likely to be affected by the proposed mines are economically based on agriculture. A high degree of similarity in life styles, and of community and family stability is characteristic of communities and families in southern Utah. Other similar communities that might be affected are Antimony (113), Cannonville (113), Fredonia, Ariz. (600), and two larger communities within 100 miles--Panguitch and Kanab--with populations of 1,500 to 1,600 each (part 1, fig. I-2). Also most likely to be affected, is Page, Arizona, about 30 miles to the south, which has a current estimated population of about 4,000.

Most residents are of Mormon religious background. Many have part-time jobs, and many of these jobs are seasonal (particularly agricultural, recreational, and tourist-oriented jobs). Residents of Page, however, are employed primarily in recreational services, in the nearby Navajo Powerplant, or are retired. The Page population is more diversified in life style and religious background.

4. Transportation

The proposed plantsite for Nos. 1-4 mines is 51 miles south of Escalante and 28 miles north of Glen Canyon City (fig. 1). Access is over unimproved secondary county roads, with steep grades and rough streambed crossings at washes. Roads are slippery when wet.

The No. 5 mine is near the southeast corner of the lease area, in Missing Canyon, a tributary to Warm Creek Canyon (figs. 4, 5). The county road past the mine is classed as a jeep trail, although all types of road vehicles, including 15-ton trucks may use the road in dry weather.

It follows the bottom of Missing Canyon and is currently the only feasible route for trucks onto the Kaiparowits Plateau from the south. At its south end the road joins the Smoky Mountain county road at the edge of the Glen Canyon Recreation Area. The latter road is a two-lane dry-weather road (FAS-423) that crosses the Glen Canyon NRA to Glen Canyon City (fig. 1).

5. Recreation and Esthetics

The regional recreation resource that would be impacted by the proposed action is described in the final Kaiparowits EIS (BLM, 1976) and in part 1, chapter II. The following description details information pertinent to an evaluation of the Kaiparowits Nos. 1-5 mining plans.

Approximately 12 miles of the present Smoky Mountain county road crosses lands within the Glen Canyon NRA. This segment is used by recreationists to reach dispersed areas of use east of the proposed mines.

There are no developed recreation services, facilities, or potable water within Missing Canyon or adjacent to the proposed No. 5 mine. Recreation use depends on the primitive road system within the impact area. Present use involves (a) four-wheel driving and viewing scenery (b) restricted collection of firewood, petrified wood, and rocks and (c) hunting small game onsite and to gain access for hunting mule deer on adjacent areas.

Onsite recreation use is day oriented, and evidence of overnight or extended recreation visits is scant. Missing Canyon has only restricted potential for back-country recreation pursuits. It is lightly used (less than 250 recreational visits per year) because it lacks potable onsite water, has sparse vegetation cover, and the geologic features are common in the region.

The landscape is arid, with strong evidence of past and present erosion and weathering, sparse vegetation, and exceptional visual range. Except for the secondary and primitive road system, minor ORV use, and evidence of coal exploration, the natural landscape is undisturbed. Scenic quality is low to common. Sensitivity to viewing, except for the travel corridor in the NRA and in the vicinity of Glen Canyon City, is low. The travel corridor within the NRA and near Glen Canyon City has a moderate sensitivity for viewing.

6. Archeology and History

Previous archeological work in the region, as well as in the lease area, indicates an abundance of archeological sites (BLM, 1976). A 10-percent coverage reconnaissance of the lease area by employees of the Museum of Northern Arizona located 26 sites in the mine area. In addition, 35 historic sites were found in the surrounding region. None of these sites are listed in the National Register of Historic Places.

CHAPTER III

ENVIRONMENTAL IMPACTS

This statement includes a summary of environmental impacts described in chapter III of the Kaiparowits EIS (BLM, 1976) and details of impacts anticipated because of implementation of the modified mining plan.

A. NATURAL ENVIRONMENT

1. LAND

a. Land surface

The proposed mining facilities would have minimal land-surface impact. Subsidence is expected above mined-out areas across the proposed 47-square-mile mining unit. Land-surface deformation related to subsidence is described in part 1 and the Kaiparowits EIS (BLM, 1976).

b. Geology and minerals

The project would impact energy resources by removing 534 million tons of raw coal. About half the minable coal in place would be recovered, and about half would be left, either as support pillars or in beds that exceed the 14-foot maximum thickness cut of the mining equipment. The future recovery of this remaining coal and the coal in three beds less than 4 feet thick is not feasible under present technology.

Geologic hazards might be created by subsidence tension cracks and by not leaving adequate support where adits enter canyon walls, especially where mining proceeds updip, and in areas of shallow overburden under canyon rims and floors. General and regional geologic hazards are described in part 1.

Impacts to paleontological resources would consist of losses of plant, invertebrate, and vertebrate fossil materials for scientific research, public education (interpretative programs), and to other values. Losses would result from destruction, disturbance or removal of fossil materials as a result of coal mining activities, unauthorized collection, and vandalism. A beneficial impact of development would be the exposure of fossil materials for scientific examination and collection which otherwise may never occur except as a result of overburden clearance, exposure of rock strata, and mineral excavation. All exposed fossiliferous formations within the region could also be affected by increased unauthorized fossil collecting and vandalism as a result of increased regional population. The extent of this impact cannot be presently assessed because of general lack of specific data on such activities.

Because of the present lack of data and accepted evaluatory criteria for determination of significance, no meaningful assessment can be presently made as to the extent and nature of the loss of these paleontological values to science or education, or hence to the significance of potential impacts on the fossil record.

c. Soils

Soil would be disturbed on a total of about 1,800 acres. The erosion rates would increase by about 1 to 12 cubic yards per acre per year from water erosion on exposed soils. After construction of the facilities and implementation of erosion control measures the erosion rates would decrease to a near natural, or lower, condition. Wind would cause increased erosion rates of as much as 50 cubic yards per acre per year on exposed sandy soils. These high potential erosion rates would occur for only a short time until the site is occupied or protected. Soil productivity would be lost temporarily, but would be regained after reclamation. Compliance with SMCRA regulations will preclude significant adverse impact to the soil resource.

2. Water

The proposed action would require about 7,600 acre-feet of water per year, 3,100 acre-feet for mining and related activities and 4,500 acre-feet for the domestic needs of the increased population. About half of the water used for domestic purposes (2,250 acre-feet per year) would be discharged as effluent from sewage treatment plants and could be reused for agriculture (part 1, chapter IV, Water); the other half plus the 3,100 acre-feet needed for mining would be consumptively used each year.

Subsidence and subsequent cracking of earth material overlying the mine may cause some surface water to be diverted into the ground, but the quantity cannot be predicted.

Mining that drains water from saturated beds will alter ground water flow and lower water levels at the minesite. Reasonable enforcement of mitigations should prevent any degradation of water quality. Water use from wells would decrease ground-water resources and also cause water-level declines. Mining would first decrease hydraulic heads in the John Henry and Drip Tank Members of the Straight Cliffs Formation and later that in the Wahweap Formation (fig. 8).

3. Air

Impacts to air quality owing to operation of the Kaiparowits Nos. 1-5 mines would not be significant. Potentially, however, the total annual emissions from the proposed Kaiparowits No. 5 mine are estimated to be 10,080 tons (40 tons from mining activities and 10,040 tons from travel on unpaved roads). Similarly, the Kaiparowits Nos. 1-4 mines would emit 410 tons per year (coal transfer and storage). Because the potential emissions are greater than 250 tons per year, the mining plans are subject to PSD permit review by EPA. Best Available Control Technology and Best Management Practice (chapter I, Legally Enforceable Mitigating Measures) will be required, thus reducing the probable impacts to air quality to an insignificant level.

Population increase (Nos. 1-5 mines) would create substantial emissions of particulates, carbon monoxide, sulfur dioxide, nitrogen oxides and hydrocarbons. The concentrations and distribution cannot be accurately quantified but no violations of NAAQS are anticipated. (See also part 2, Red and Blue mines, chapter III, Air.)

4. Vegetation

About 1,800 total acres of Desert Shrub type vegetation would be destroyed by mining; about 107 acres by Nos. 1-5 mines portal facilities and 1,700 acres by the preparation plant and preliminary proposed transportation facilities. The No. 5 minesite and access road (fig. 5) would account for about 35 acres of the total (table 1).

5. Wildlife and Fisheries

Kaiparowits mine development would deteriorate wildlife habitat in four ways: physical destruction or alteration, encroachment, harassment, and depletion of surface-water sources. Many kinds of wildlife would be affected.

Mule deer use would be reduced on 5,800 acres of range in the vicinity, beginning during the construction period and continuing through the mining operation. Construction would disturb about 1,800 acres of habitat, and the accompanying disturbance and encroachment associated with construction and mining would reduce deer use on another 4,000 acres. Deer habitat deterioration may increase over the 35-year life of the mine to affect as much as 30,000 acres because of the potential loss of springs and surface water. Scarce water supplies now are a principal cause of moderate and spotty mule deer populations.

Mountain lions are highly dependent on deer for food; therefore, any impact on deer would impact mountain lions.

Land surface disturbance would lower the prey animal (including cottontails) populations. They would be expected to increase after construction is completed, reoccupying approximately 170 acres that were not permanently altered. Predatory mammals and raptors would quit the facilities area because of reduced prey and would shun the vicinity because of increased disturbance.

If surface water sources are depleted, some species would abandon the affected area. Habitat deterioration from this impact would reduce the number of predatory mammals and birds that require available water and that are restricted in travel distance from it. This would reduce predation. Many small prey, which satisfy their water needs from moisture in plant materials, insects, or metabolic water, may, thus, benefit.

The projected new inhabitants in the Kaiparowits vicinity would require extensive homesites and possibly a new community as proposed in the Kaiparowits EIS. If a new townsite is established on East Clark Bench, the chance of permanently establishing the recently reintroduced antelope herd there will be greatly reduced.

The demand for game and fish in the vicinity would increase. An increase would be expected in illegal killing and taking of all protected fish and wildlife.

The expected traffic on up graded access roads would increase wildlife fatalities from vehicle strikes, might promote access to remote areas and increase encroachment, and would increase harassment to wildlife. New powerlines to the mine would present a strike hazard for all birds.

B. CULTURAL ENVIRONMENT AND LAND USE

1. Agriculture, Range, and Timber

About 40 AUM's of grazing capacity would be lost--perhaps 2 AUM's to the No. 5 mine surface facility and access road. The increased traffic would pose a threat to livestock and would disrupt some of their normal grazing and watering patterns; however, better access would aid in hauling water for livestock use.

2. Socioeconomics

The task force estimates that the proposed mines at full production would add 21,000 to 22,000 new residents to the region. Of this number 40-60 percent would probably live in mobile homes grouped within new mobile home enclaves. Because of potential transportation problems, as suggested in Kaiparowits EIS, mine construction employees may live in special work camps during the work week. Population increases of this magnitude are characterized by high rates of job and community transiency, high employee turn-over rates, relatively high rates of juvenile delinquency, petty crimes, suicide, and family problems. Associated urbanization would result in such significant impacts as: increased need for housing, increased need for school construction and for teaching and service personnel; a trend toward more cosmopolitan life styles; and changes in present local governmental and political organizations. Resulting infrastructure problems would require taxing and bonding of local, county, and (or) State residents to construct, operate, and maintain sewers, water facilities, streets, trash collection and disposal, and police and fire protection.

If all mines were at full production level, the annual payroll is estimated at $50-55 million (1978 dollars). This could mean $800-$1,500 monthly salaries for most mine employees. It is probable that an income gap could develop among local employees involved in mining, and those local employees in other more traditional economic enterprises. Possible benefits from higher miner incomes, the increased tax base, and the increased total regional income would expand the southern Utah economy, particularly in the Kanab to Page area. Effects of this new payroll are discussed in chapter IV of part 1.

3. Transportation

The current road system cannot handle mine-related traffic (table 3). At the 12 mty level from Kaiparowits 1-5 mines, present Federal highways are inadequate and an enhanced transportation system would be needed. Maximum mine-related traffic on U.S. Highway 89 at Glen Canyon City could be as great at 3,960 vehicles per day for all five mines or about 640 vehicles per day for the proposed No. 5 mine. The present average through-traffic is 890 vehicles per day.

TABLE 3.--Traffic estimates, proposed Kaiparowits Nos. 1-5 mines

	Nos. 1-5 mines	No. 5 mine
Tons/year	12 million	1 million (154 25-ton loads/day).
Marysvale:		
Distance (miles)	[1]	212
Trucks/day (25-ton load)	[1]	154 (1 round trip each).
Cedar City:		
Distance (miles)	[1]	163
Trucks/day (25-ton load)	[1]	77 (2 round trips each).
Flagstaff:		
Distance (miles)	[1]	178
Trucks/day (25-ton load)	[1]	154 (1 round trip each).
Alvey Wash:		
Distance (miles)	[1]	44
Trucks/day (25-ton load)	[1]	26 (6 round trips each).
Commuters-Glen Canyon City:		
Distance (miles)	28	24
Vehicles/day	[2]1,740	[2]145
Mine service vehicles/day	[3]240	[3]20
Mine-related vehicle passages at Glen Canyon City	3,960	638
Current vehicles/day along route	5	5

[1] Not proposed.
[2] Two persons per vehicle.
[3] Ten vehicles per day per one-half million tons annual production.

The county road from Glen Canyon City to the mine, if upgraded, would be adequate for 1 mty coal-haul, and work force and service traffic. However, upgrading this road is not part of the company proposal and is in dispute, possibly involving the proponents, the State, Kane County, BLM, NPS, and the El Paso Coal Co., (proponent of the proposed Red and Blue mines to the north that might use the same access roads). Impacts resulting from a proposed powerline and telephone line to the mines are minor and are analyzed in the Kaiparowits project EIS (BLM 1976).

Power for the Kaiparowits No. 5 mine is to be provided by an onsite generator. Proposals to transport coal from the Kaiparowits Nos. 1-4 mines are not definite and the impacts that might result cannot be quantified at this time. The proposals are described in chapter I and in part 1, chapter VIII.

4. Recreation and Esthetics

Mining facilities, developments, and activities within the project area would impact the remote, undisturbed character of the environment. Noise nuisances and air pollutants in the form of dust and odors would be introduced or increased, resulting in a loss of solitude and serenity. New populations (21,000 to 22,000 people) within the region to support the proposed mines (Kaiparowits 1-5 mines) would generate an additional 196,700 recreation visits and 613,700 recreation visitor days use to national, regional, and local recreation use areas and attractions. In comparison to the present use-rate in the region of more than 5,029,000 visits and 8,061,000 visitor days use, this increase would not be significant, if uniformly distributed to all attractions listed in part 1, table II-32. However, the majority of this use would accrue to the Glen Canyon NRA because of its proximity.

This use, in combination with other projected increases in visits and visitor days by nonresidents and residents, could exceed the carrying capacity of the NRA and could cause serious damage to natural ecosystems. In addition, litter, vandalism, and overcrowding within the NRA could cause user dissatisfaction and lowering of expected user experience level. It could also create safety hazards to individuals using the lake and transportation facilities within and adjacent to the NRA.

Secondary and primitive road improvement would scar the natural landscape with needed cuts, fills, culverts, and borrow areas and litter and vandalism would increase. Although increased use would result in conflict between recreation and mine traffic on the county road within the NRA, enhanced access would make more area available for recreation use.

The No. 5 minesite would straddle the county road in Missing Canyon and would enable recreationists to see an operating coal mine, even though the mine would intrude on the natural environment. Portals 1-4 and the preparation plantsite would be far enough from the county road to go unnoticed by the casual observer (fig. 3).

5. Archeology and History

Investigations indicate an adverse impact to cultural values by the proposed activities. Increased population may result in more vandalism of archeological sites. Easier access to the area would also increase vandalism. No properties listed in the National Register are located in or near the area to be developed.

CHAPTER IV

MITIGATING MEASURES

State and Federal laws, regulations, and administrative policies that require mitigation or reclamation of mine areas, and requirements of the surface-management agencies and the USGS Area Mining Supervisor are in the regional EIS, part 1, chapter III. These mitigating measures, and those in sections C and D of chapter I shall be required and part of the Kaiparowits mining plans.

CHAPTER V

ADVERSE EFFECTS THAT CANNOT BE AVOIDED

Adverse effects cannot be avoided on about 1,800 acres of surface area disturbed by construction and occupied by facilities. Subsidence would occur to some degree across the 47-square-mile proposed project area above mined-out coal beds. Chapter V of part 1 describes general subsidence-related geologic hazards.

Seven coal beds were identified by drilling, and four were considered to be commercial. At 50-percent recovery, about 534 million tons of nonrenewable coal resources, representing about 5 percent of the known reserves on the Kaiparowits Plateau, would be lost. The thinner beds of coal, representing about 4 percent of the total leasehold resource, are considered to be unrecoverable by present-day technology.

Unavoidable destruction, disturbance, and removal of paleontological resources, both exposed and unexposed, would occur. The significance of this impact cannot be meaningfully assessed due to the lack of data and evaluatory criteria.

Soils on about 1800 acres would be disturbed and altered from their natural conditions. About 1,660 acres would be occupied by facilities during the life of the project and the soils taken out of production until the mining ceases and the area is reclaimed. Although some increases in soil erosion can be expected, compliance with SMCRA regulations will assure proper soil protection and conservation measures to prevent significant adverse impacts to the soil resource. Because of mitigations required (SMCRA and BACT) no more than a very small increase in emmissions to the air is anticipated.

Water requirements would be about 7,600 acre-feet per year. Of the total requirement, 5,350 acre-feet per year would be consumptively used, and 2,250 acre-feet would be discharged as treated sewage efficent. Mining could alter ground-water flow and lower water levels above the coal beds, and may affect discharge to seeps and springs. If springflow and streamflow are reduced, wildlife habitat will be adversely affected.

The vegetation lost to Nos. 1-5 mines, the coal preparation plant, and the improved access route cannot be avoided. The mining complex would cause an annual 40 AUM's grazing capacity loss (about 2 AUM's annually for No. 5 mine).

The anticipated population increase would cause substantial emissions of air pollutants but no NAAQS violations are anticipated.

The current road system is inadequate to carry mine related traffic at the 12 mty level. Upgrading of the proposed Smoky Mountain and Missing Canyon county road and its use for 1 mty coal-haul (mine No. 5) would impact the recreation and esthetic resource of the area.

The present esthetic environment would be adversely affected by upgrading the present road system to handle the proposed mine-related traffic. Industrial modifications, along with associated activities, would reduce the remote, unoccupied, and natural appeal. Recreation use, both onsite and to regional recreation attractions, would increase. Adverse impacts, such as loss of solitude, littering, and some vandalism, could result from this increased use. Conflicts between recreation and mining traffic would create safety problems on the county road within the Glen Canyon NRA and would adversely affect the recreation resource. Increased dust, industrial odors, and noise could create conflicts with recreation users seeking solitude, unconfined, and backcountry recreation experience. Increased population in the area may result in vandalism to archeological and historical sites within the region.

CHAPTER VI

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

Subsidence-related geologic hazards would permanently alter the land surface above mined-out areas, should 534 million tons of coal be taken from the four commercial beds. A similar amount of coal in the four commercial beds and coals in the three identified noncommercial beds, the lower bed left intact, would be unrecoverable under present technology.

Activities related to mining would result in impacts to an unknown number of exposed and unexposed fossil localities. These activities would also result in a gain in knowledge of paleontological resources because of surveys and exposure of resources which might never have been found without excavation.

About 1,660 acres of soils would be occupied by mine facilities and lost to production throughout the project life. Soils would be disturbed on an additional 150 acres, and productivity would be temporarily lost (2 to 5 years). The approximately 1,800-acre disturbed area would be restored to a near natural productivity level with prescribed reclamation after mining has been completed.

Any loss of springs and related streamflow due to subsidence or wells on the 47-square-mile mine area would restrict long-term livestock and wildlife use. The mining activities and any housing encroachment upon wildlife habitat would have a long-term adverse effect on wildlife population potentials.

The loss of vegetation and grazing capacity previously cited would continue for the project life. In the long term, after successful reclamation, these areas would be as productive as they are now.

Permanent roads constructed to handle mine-related traffic would remain for other uses after mining is completed. Short-term transportation/utilities components on the leasehold would be salvaged and the sites reclaimed.

Improved lease-area access would slightly increase short-term recreation use. Few long-term recreation-resource effects would accrue because of restricted recreation-use potential. The visual character would be modified from remote-unoccupied to industrial during mining and for some time after reclamation. The area would eventually return to its present condition, except for permanent roads. Long-term or extensive impacts to the esthetic resources would be minimal.

Any archeological and historical sites disturbed during development of the site would result in a long-term impact to the inplace value of that site. Collection of sites that might be found will insure recording of information that could otherwise be lost to natural forces or to vandalism.

CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The 534 million tons of mined coal would be a consumed non-renewable energy resource. About the same amount of coal would remain as an irretrievable resource unless recovery methods are developed. An undetermined number of uninventoried exposed and unexposed fossil localities would be lost or disturbed.

Disturbance of the natural soil characteristics by mixing and rearrangement of the soil layers would be an irreversible action. The soil eroded as a result of the project would be irretrievable, as would be the soil amendments and energy used for reclamation. Termination of mining would terminate any slight increase in air degradation because of mining and supporting travel. Some long-term deterioration of air quality might result from any long-term growth originally induced by mining.

Disruption of saturated sandstones because of mining would be irreversible. Water used for mining and related purposes (7,600 acre-feet per year would be irretrievable except for that discharged as effluent from sewage treatment plants (2,250 acre-feet per year), which could be reused.

The vegetation growing on the project area along with the grazing capacity would be irretrievably lost. The 40 AUM's per year for 35 years (minimum project life) make a total of 1,400 AUM's lost. About 70 AUM's would be lost to No. 5 mine over 35 years. Proper reclamation of the disturbed area would prevent any irreversible commitment of the vegetative and grazing resources, except for the proposed access road if upgraded; however, the loss of spring flows, streamflows, and the encroachment of housing developments would have an irreversible deteriorating effect on wildlife habitat. Deer, mountain lion, and all other wildlife lost because of habitat destruction or reduced habitat use would be irretrievable.

All birds, mammals, reptiles, or other wildlife killed by vehicle strikes, illegally shot, or birds killed in collisons with new powerlines would be irretrievable.

All energy and resources committed to road construction and to truck hauling as much as 1 million tons of coal (No. 5 mine) would be irretrievably lost. At full production, commuting miners would use 1.7 million gallons of gasoline per year (61 million gallons in 35 years). The commuters to No. 5 mine would use about 140,000 gallons of gasoline per year (5 million gallons in 35 years).

Road improvement would commit the area to additional irreversible recreation use. The remote-unoccupied character would be modified and partly lost during the project life. This loss, even after reclamation, would be irretrievable. Esthetic resources would be irretrievably lost to the proposed road system, and future generations would be committed to viewing and using the area with some improved roads in place. Any cultural resources in the immediate project area probably could not be preserved in in place.

CHAPTER VIII

ALTERNATIVES

Approval of the applicant's mining and reclamation plan, as submitted, has been analyzed as the proposed Federal action in this statement. Alternatives to that course of action are discussed below.

A. NO ACTION

Pursuant to implied covenants of both the Federal mineral leasing laws and the existing lease agreements, the Secretary of the Interior must respond to a legitimate application to conduct operations on a valid Federal lease, provided all terms and conditions of the lease have been met. The Secretary's response may be approval as proposed, rejection on various legitimate grounds, or to defer decision based on proper grounds. "No action" on the applicant's proposed mining and reclamation plan would mean maintaining the status quo on the leasehold. The impacts of taking no action would be the same as described subsequently under the alternative "Reject the mining and reclamation plan."

B. DEFER FEDERAL ACTION

In the event of noncompliance of the applicant's proposed mining and reclamation plan to provisions of the Surface Mining Control and Reclamation Act of 1977, the Secretary must defer action on the proposed plan. For other proper causes, he may also defer the decision. Such causes could include, but are not limited to, the time required and the need for the following:

- Modification of the proposal to correct deficiencies unrelated to SMCRA or to reduce or avoid environmental impact.

- Acquisition of additional data to provide an improved basis for technical or environmental evaluation.

- Further evaluation of the proposal and (or) alternatives.

- Development of an adequate system to monitor impacts for management and regulation.

The principal effect of deferring action would be a short-term delay in the imposition of all related impacts, both adverse and beneficial, of the applicant's proposal discussed in this statement.

The mining and reclamation plan included in this statement was prepared prior to the promulgation of the initial regulations (30 CFR 700) required under section 502 of the Surface Mining Control and Reclamation Act of 1977.

The Office of Surface Mining (OSM), which was created by that act, has not reviewed the plan for compliance. Therefore, the mining and reclamation plan may not reflect the requirements of the initial regulations. However, in this statement the applicable initial regulations are considered as required Federal mitigating measures.

The mining and reclamation plan should be returned to the operator, with a request that it be revised in accordance with the applicable initial regulations. As soon as the mining and reclamation plan is revised and returned to the regulatory authority, it will be evaluated to determine compliance with the requirements of 30 CFR 700.

Action could also be deferred until the plan is modified to include one or more of the alternatives discussed below in subsection E. These alternatives if implemented would reduce or avoid some environmental impacts of the proposed action.

C. PREVENT DEVELOPMENT OF THE LEASE

1. Reject the Mining and Reclamation Plan

The Secretary may reject a proposed plan that does not meet the prescriptions of applicable law and regulations under his authority, including the potential for environmental impact that could be reduced or avoided by adoption of a significantly different course of action by the applicant. Except when a mine plan does not comply with existing regulations, the Secretary cannot under present circumstances reject the proposed plans to the extent that a de facto cancellation of a lease results unless he seeks and obtains additional authority from the Congress. Viability of this option is dependent upon timely legislative action; the option of rejecting the proposed plans pending legislation remains available.

If the Secretary were to reject the mining and reclamation plan, the lease would not be mined, and impacts previously discussed would be deferred until an acceptable plan was approved. The lease would continue in its present condition, subject to modification by natural processes and by the continuation of other existing activity and uses--and to further modification by the surface owner to meet other uses. However, the development of alternative sources of energy, such as other coal mines in the county, or a reduction of national energy consumption, could result. The applicant could correct the deficiencies in the plan and resubmit a modified mining and reclamation plan for approval. The result would be similar to that described in the alternative "Defer Federal action."

2. Seek Legislation to Cancel the Lease

The Secretary has very limited authority with respect to cancellation of an existing Federal coal lease. One such authority is prescribed in the lease terms entitled "Proceedings in case of Default."

A second authority was mandated by provisions of sec. 6 of the Federal Coal Leasing Amendments Act of 1975 (P.L. 94-377) which was subsequently written into regulations as 43 CFR 3520.2. The authority relates to failure of the lessee to meet the requirements for diligent development of the lease as defined by the Act.

The authority to cancel on other grounds would require congressional authorization for such action as well as for the requisite funds for compensation to the lessees. The Administration has not requested such legislation, and the Congress has not initiated such legislation related to the matters considered in this statement. The possibility of such actions is a matter for further consideration by the Administration and the Congress in the light of this environmental statement and other relevant nonenvironmental concerns.

To the extent that future coal production from this lease was curtailed or halted, alternative sources of energy would be required to meet anticipated needs and demands. The time required to replace the coal production potential could range from a few to several years. If this lease were cancelled through congressional authorization, all physical, biologic, and socioeconomic impacts stemming from the proposed mine would be avoided. Conversely, if development eventually were authorized, environmental impacts as discussed previously in this statement would occur, although impacts would be deferred in time and perhaps reduced because of changes in technology or requirements imposed at that time.

3. Exchange the Existing Lease

If the Secretary determines it to be in the public interest, he may initiate a proposal to the lessee for exchange of the existing Federal lease involved in this proposal for lease of other tracts of Federal coal or tracts of Federal sodium, phosphate, potash, or sulfur of comparable value, or for a grant of various future rights.

The Department of the Interior considers that the public interest would be so served if the Secretary finds that the benefits of production from the lease would not outweigh the adverse effects, or threat of damage of destruction to agricultural production potential, or scenic, biological, geologic, historic or other public interest values from lease operations. In exercising his discretion to exchange mineral leasing values in the public interest, the Secretary shall consider, but is not limited to, consideration of these elements of the public interest: recreational use; archeological or historic values; threatened or endangered species; proximity of residential or urban areas; study for potential inclusion in the wilderness or wild and scenic rivers systems; and value for public highways, airports, and rights-of-way.

Should the Secretary initiate such a proposal, the lessee is under no obligation to enter into such negotiations and may refuse to consider it.

If such a proposal is made and is rejected by the lessee, or if negotiations are entered and not agreeably concluded by the parties, and if the operations described in this statement are not otherwise prevented, such operations would eventually proceed and result in the impacts identified therein.

If an exchange proposal is made, accepted, and agreeably concluded for coal that is contiguous or very near to the existing lease, the proposed plan would have to be revised, resubmitted, and assessed. If the new plan encompasses the same methodology to be used in coal development, many of the impacts described herein would likely be very similar to those resulting from the new proposal, with a relatively short-term delay (several years) in their initiation. If a wholly different methodology is proposed for development of the replacement lease (e.g., underground versus surface mining), it could be substantially different from those described in this statement, and cannot be forecast at this time.

Presumably the unacceptable impacts or effects prompting the exchange would be avoided or substantially reduced in development of the replacement lease and found to be in the public interest. The existing lease would be relinquished, would not be mined, and would continue in its present condition as discussed below.

If an agreeable exchange were made for coal located elsewhere, or for a different mineral commodity located elsewhere, the relinquished lease would continue in its present condition, subject to modification by natural processes, by the continuation of other existing uses and activity, and to further modification by the surface owner to meet other uses. Potentially, the coal reserves relinquished would be withdrawn from development and this source of energy foregone. Direct financial benefits to the public may change in an exchange of leases.

The impact of exploration and development of the replacement lease under these circumstances will be translocated in space and time. They will relate to time and location, physical environment at the new site, mineral commodity involved, development technology proposed and approved, and other factors, none of which can be quantified or evaluated until the replacement lease is identified. The environmental impact of potential development of the replacement lease rights to be granted would be evaluated and considered in the exchange process, and while they may be greater or less than those described in this statement, they must be ultimately judged by the Secretary to be more environmentally acceptable than development of the relinquished lease, and to be in the public interest. Costs to the Department in identifying and evaluating one or more replacement tracts to be offered in the exchange could be substantial, and very likely be significantly more than the lessee's costs in establishing the fair market value of the tract to be relinquished.

4. Suspend Operations

The full development of existing leases could be delayed by suspension of operations. If such action were taken, there would be no additional incremental environmental impact on the area, and it would continue in its present condition, subject to further modification by natural processes, the continuation of existing mining activity, and such future uses of the surface as the owners may decide.

The authority of the Secretary of the Interior to suspend operations on existing leases has already been utilized on other Federal leases. Suspension of operations of this existing lease, for reasonable periods, with proper grounds, could be imposed. The Secretary cannot, under present circumstances, suspend operations to the extent that a de factor cancellation of a lease results unless he seeks and obtains additional authority from Congress. Viability of this option is dependent upon timely legislative action; the option of suspending operations pending legislation remains available. Impacts of this alternative would be similar to those described under "Cancel the lease."

5. Federal Reacquisition of Leased Rights

The outstanding leasehold interests could be acquired by the Secretary. The ability to acquire the leasehold interests is not granted by the existing relevant statutes and would require Congressional authorization for such action as well as for the requisite funds for compensation of the lessees. To date, the Administration has not requested such action, and the Congress has not initiated or considered such legislation; the possibility thereof is thus conjectural at best. The major effects of such Congressional authorization would be similar to those of cancellation of the leases as previously discussed.

D. RESTRICT DEVELOPMENT ON THE LEASE

The subject leases convey the right to develop, produce, and market the Federal coal resource thereon if all other terms and conditions have been met by the lessee. In general, the Secretary does not possess the authority to arbitrarily restrict development either as to location or rate. Various measures that may tend to restrict development may be taken by the Secretary at any time in the interest of conservation of the resources or in the protection of various specific environmental values in accordance with existing laws and regulations; for example, the National Historic Preservation Act of 1966, the Endangered Species Act of 1973, etc.

Thus, under present conditions, a general effort to restrict or regulate development of the existing lease for reasons other than failure to comply with existing laws and regulations would constitute a selective application of the "prevent development" alternative already discussed; that decision, as related to impacts, possible litigation, and the need for authorizing legislation, would be relevant in this instance.

In addition, application of this alternative might not permit maximum recovery of the coal resources and would thus be contrary to principles of conservation embodied in the legislation which authorizes the leasing of these lands for the purposes described. It is entirely possible that such selective mining would leave isolated blocks of coal that might never be recovered owing to the high costs of mining such remnant areas at a later date.

E. REQUIRE MODIFICATION OF THE MINING PLAN

1. Highway Relocation

Conflicts between recreation and mine traffic within the Glen Canyon NRA could be mitigated by constructing the originally proposed Lone Rock Canyon Highway (fig. 7); however, the haul from the No. 5 mine would be 16 miles longer, with more adverse grade. Visual impacts associated with any road construction could be mitigated to some extent by taking advantage of natural terrain features.

2. Approve Only Part of the Plan

An alternative to approval of the total mining plan is approval of only the No. 5 mine. The proposed No. 5 mine plan presents provisions for power, water, and coal transportation, which is not true for mines Nos. 1-4. The participants estimate total recoverable reserves of 534.5 million tons on 30,000-acre mining unit. At this ratio, the 2,500-acre No. 5 mine unit would conceivably have about 44.4 million tons of recoverable reserves; enough for a 44-year operation at one mty.

Construction on the 15-acre minesite would cause minimal land-surface impact. Land-surface subsidence is expected above mined-out areas across the 2,500-acre mining unit. Impact to air quality because of mining and population growth would be small.

Energy resources would be impacted by removing one mty. About half of the commercial coal in place would be recovered, and about half would be left, either as support pillars or in beds with thicknesses that exceed mining-equipment capabilities. The 1 mty of mined coal would be consumed as a nonrenewable energy resource, and a similar amount would be left in place as an irretrievable resource. Other irreversible and irretrievable commitments of resources are described in chapter VII. Subsidence effects cannot be avoided above mined-out areas across the mining unit. Other unavoidable adverse effects are detailed in chapter V.

At one mty production, the water requirement would total 230 acre-feet per year, 50 for mining and 180 for the domestic needs of the increased population. About half the domestic water (90 acre-feet per year) would be discharged as sewage.

This proposed alternative could add an additional 850 to 900 new residents in the Page, Arizona, to Glen Canyon City, Utah, area. This additional population impact would be minimal if most of the miners and their families were to locate in Page, Ariz. Greatest impacts would occur due to urbanization and housing demands in the towns of Page and Glen Canyon City and, possibly, Kanab, Utah. Following present trends, most of the new residents would probably live in trailer homes, and the trailer home sites might develop anywhere on private lands along U.S. Highway 89, Kanab-Page Corridor. Other impacts are described in chapter III and in chapter IV of the regional EIS, part 1.

Adverse effects cannot be avoided on 15 acres at the minesite and on 20-acres required to upgrade the primary preposed haulroad. An alternative to hauling coal across the NRA would require improvement of 33 miles of existing Jeep trail that follows Nipple creek on the west side of Nipple Bench. (See Red and Blue mine, chapter VIII and fig. 10.) This route involves 2 1/2 miles of adverse haul up Missing Canyon. Environmental impacts would be equivalent to upgrading the county road down Missing Canyon.

Surface mitigating measures would restore the No. 5 minesite in Missing Canyon to a near natural contour. Prescribed soil and vegetation reclamation mitigations would restore and possibly increase grazing capacity on the 15-acre minesite.

Subsidence-related geologic hazards would permanently alter the land surface above mined-out areas. Over 35 years about 35 million tons of coal would be mined, and a similar amount would be unrecoverable by present technology. Eight thousand acre-feet of water would be needed to produce 35 million tons of coal; 5,000 acre-feet would be consumptively used, and 3,000 acre-feet would be discharged as sewage. Other short-term uses versus long-term productivity are described in chapter VI.

CHAPTER IX

CONSULTATION AND COORDINATION WITH OTHERS[1]

A. FEDERAL AGENCIES

Reviews of first draft of environmental impact statement by national and (or) local offices of the Bureau of Land Management, State Director for Utah; Geological Survey; Forest Service; Fish and Wildlife Service; Soil Conservation Service; and National Weather Service.

B. UTAH STATE AGENCIES

Geological and Mineralogical Survey, Division of Water Resources, Division of Water Rights, Division of Health, State Engineer, State Climatologist, Division of Wildlife Resources, Division of State Lands, Division of Parks and Recreation, Department of Transportation, Outdoor Recreation Agency, and Institute for the Study of Outdoor Recreation and Tourism, Utah State University, Logan, Utah.

C. COUNTY AND LOCAL GOVERNMENT

Southeastern Association of Governments

D. PRIVATE INDIVIDUALS AND ORGANIZATIONS, INDUSTRY AND NONINDUSTRY

J. D. Spaulding, J. F. Havard, J. Lagarias, C. B. Tillson, Jr., and E. N. Thurmond, Kaiser Engineering. John E. Nelson, Kane County Engineer and Raymond D. Behle, Kane County Attorney.

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[1] See part 1 of the FES for a description of the consultation and coordination efforts involved in the preparation of the entire FES.

CHAPTER X

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SITE SPECIFIC ANALYSIS
OF THE PROPOSED ALTON MINE
KANE COUNTY, UTAH

Lease numbers (Utah International, Inc.):

U-098774
U-098775
U-0105404
U-0115938
U-0122579
U-0122582
U-0122583
U-0122584
U-0122623
U-0122647
U-0122649
U-0122650
U-0122651
U-0122652
U-0122675
U-0124768
U-0126916
U-0140770
U-0147999
U-0149582

Lease numbers (Nevada Electric Investment Co.):

SL-064507
SL-058575
U-060745
U-060746
U-065012
U-083072
U-098705
U-0101153

PROPONENT: UTAH INTERNATIONAL, INC.

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CHAPTER I

DESCRIPTION OF PROPOSED ACTION

A. INTRODUCTION

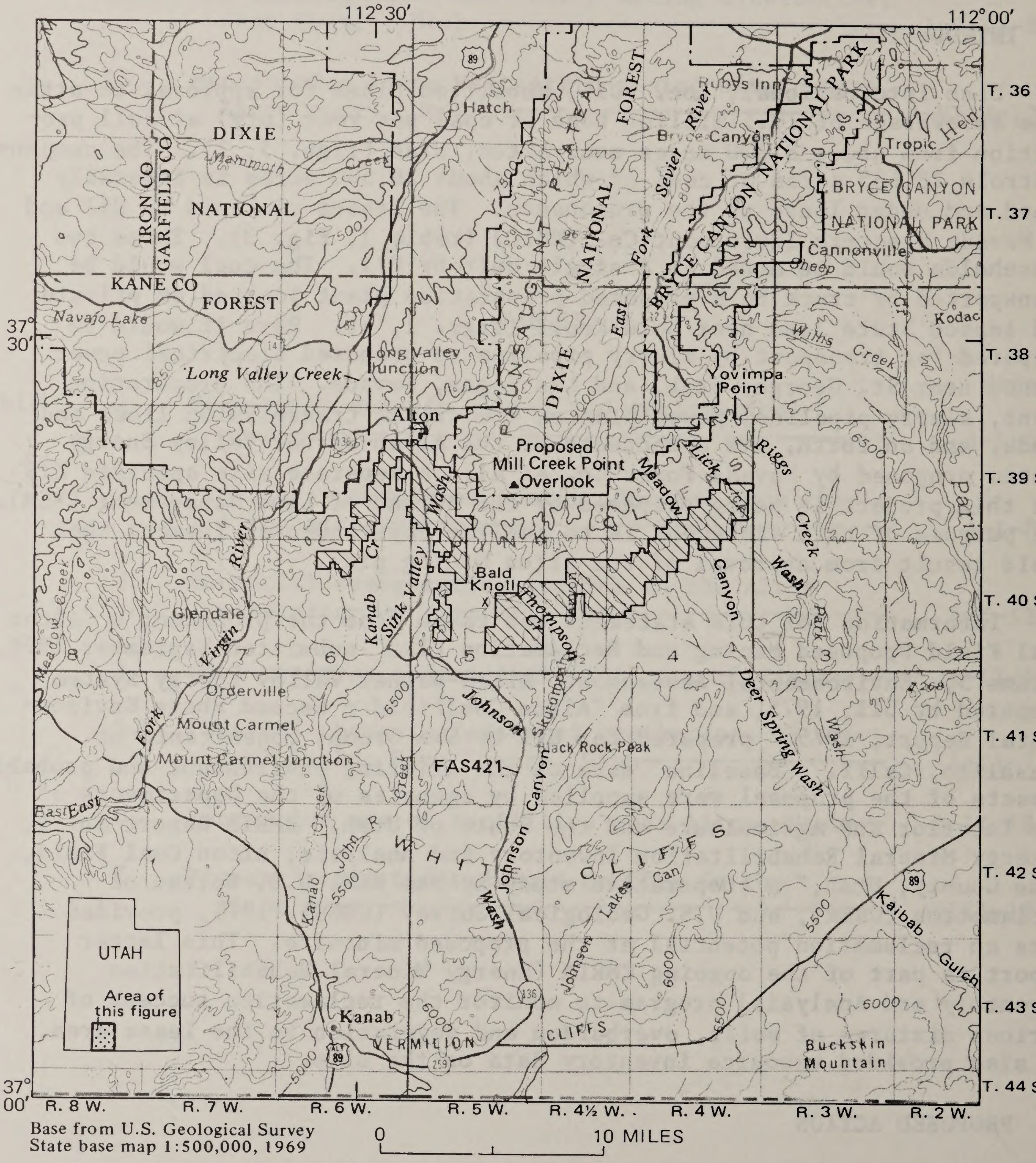
Utah International, Inc. (UII) submitted plans for approval to strip mine an average of 10.5 million tons of coal per year (mty) at full production from about 8,300 acres near Alton, Utah (figs. 1, 2). The company controls 28,635 acres of coal of which about 26,500 acres is federally owned and under lease to the proponents. The leases are held by UII and by Nevada Electric Investment Co. (NEIC) (table 1, fig. 3). These two leaseholds would be mined as a single unit by UII. The coal would be transported by truck to a proposed preparation plant located on private and leased State land near Bald Knoll (figs. 1, 4). Here it would be prepared for transport by slurry pipeline to proposed electrical power plants near St. George, Utah, and Las Vegas, Nevada. The preparation plant, slurry pipeline, power plants, electrical transmission lines and roads, and so forth, are components of the Allen-Warner Valley Energy System proposed by Nevada Power Co. et al. A separate site specific EIS for this project is being prepared by the Bureau of Land Management (BLM). The purpose of this statement is to analyze environmental impacts that could result from approval of the Alton mining plan.

Information for this statement was taken from the proponent's "Alton Coal Field Proposed Mining and Reclamation Plan" submitted September 1976, volume 5, "Environmental Assessment, Allen-Warner Valley Energy System" prepared by UII, 1975, and from "Alton Coalfield - Second Phase Environmental Report, 1975," prepared for UII by SWA Group, consultants of Sausalito, Calif. "Baseline" data on the existing environment and probable impacts of the proposal were supplied by agencies of the Departments of the Interior and Agriculture and the State of Utah. EMRIA Report No. 4, "Energy Mineral Rehabilitation Inventory and Analysis, Alton Coal Field, Kane County, Utah," a cooperative study by the BLM, U.S. Bureau of Reclamation (USBR), and U.S. Geological Survey (USGS), 1975, provided data on reclamation potential at the proposed minesite. This latter report is part of the ongoing EMRIA (Energy Mineral Rehabilitation Inventory and Analysis) program to monitor the reclamation success of various mixtures of soils, overburden and vegetation in the lease area. It also provided resource inventory data on the site.

B. PROPOSED ACTION

The surface minable coal resources of the Alton field are divided into Alton West controlled by NEI and Alton East controlled by UII. These mine areas have been divided into blocks to be mined in a scheduled sequence, full production being reached in the sixth year of mining (fig. 5, table 2).

The proposed method of operation is strip mining adapted to the varied topography and conditions. The stripping will uncover coal near-



Base from U.S. Geological Survey
State base map 1:500,000, 1969

FIGURE 1.--Map showing proposed Alton mine area, Kane County, Utah.

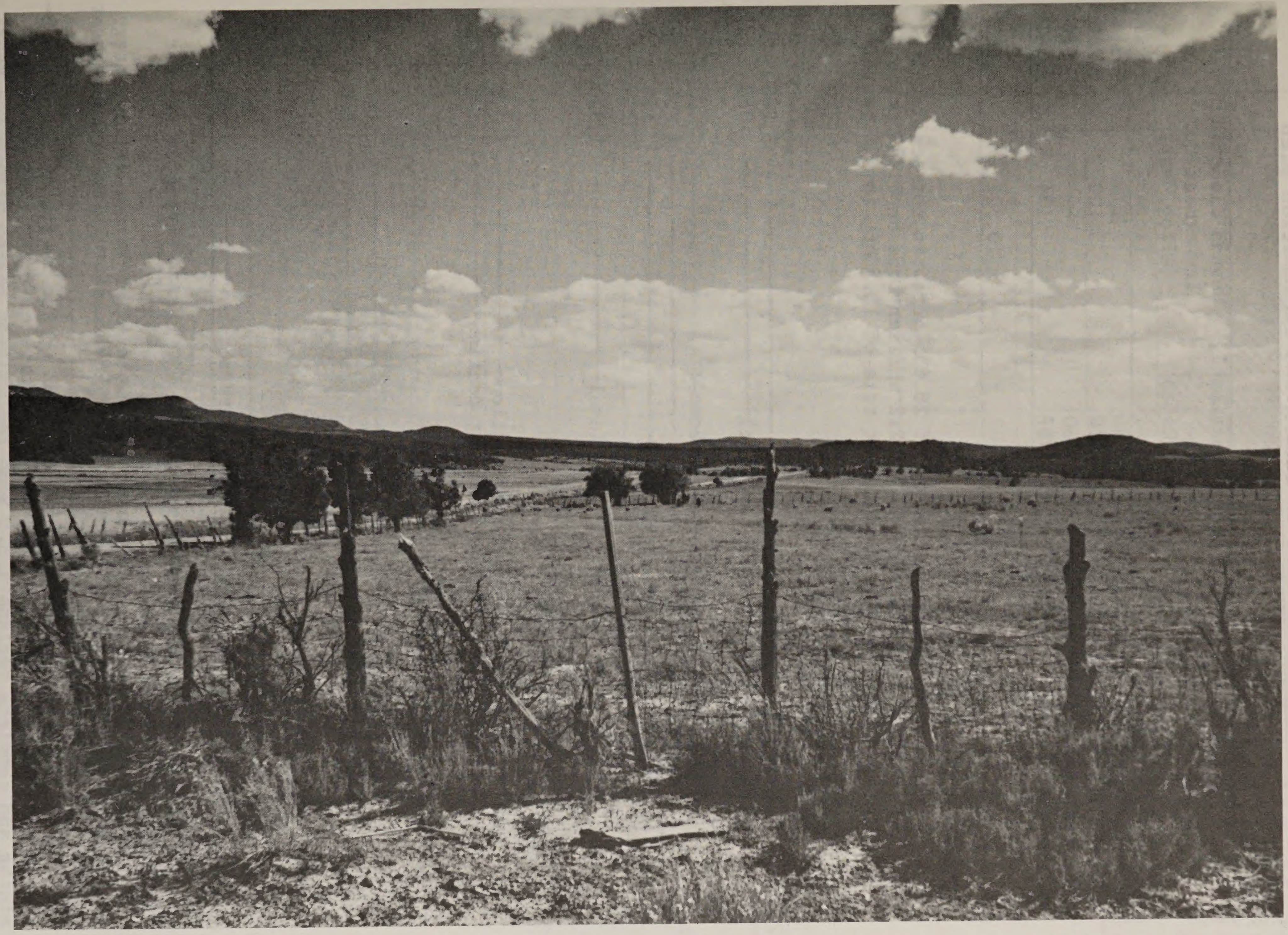


FIGURE 2.--Southward view of the Alton coal fields from the community of Alton. Fields and ridges on the far side of road are part of the Alton East mine area, and those in the foreground are within the Alton West mine area.

TABLE 1.--Summary of data in mining and reclamation plan

Leaseholds	Utah International, Inc. (Alton East) (acres)	Nevada Electric Investment Co. (Alton West) (acres)	Total
Federal coal, Federal surface--	15,040	7,274	22,314
Federal coal, private surface--	1,120	3,100	4,220
State coal lands---------------	960	---	960
Private coal lands-------------	987	154	1,141
Total-------	18,107	10,528	28,635

Coal:

Reserve of entire leasehold of 28,635 acres is not accurately known; in-place reserve of 212 million tons on 8,280 acres proposed for strip mining at rate of 10.5 mty for 23 years.[1]

Surface disturbance (acres):[2]

Strip mine area-------------------------------------	8,280
Strip mined each year (average)---------------------	360
Area disturbed at one time (acres):[3]	
Pits--	1,800
Mine roads outside pit area----------------------	130
Total------------------	1,930

Production schedule (years):

Initiation of mining to production------------------	2
Initiation of mining to full production-------------	6

Water requirements (acre-feet/year):

For mining--	160
For increased population[4]--------------------------	740

Personnel requirements:

Construction workers--------------------------------	85
Mine operation workers at full production-----------	620

[1] Based on mining depth no greater than 150 feet. Mining to greater depth would extend mine life.

[2] Ancillary facilities are described in the Allen-Warner Valley energy system proposal and evaluated in a specific environmental impact assessment prepared by BLM (Salt Lake City, Utah).

[3] Area disturbed at one time is dependent on the length of the disturbance period which is the time between vegetative clearing that preceeds mining and complete reclamation. Some reclamation begins within one year after initial disturbance. A 5-year disturbance period is assumed for analysis.

[4] Mine-induced population increase of about 3,700 using 0.2 acre feet per year per capita.

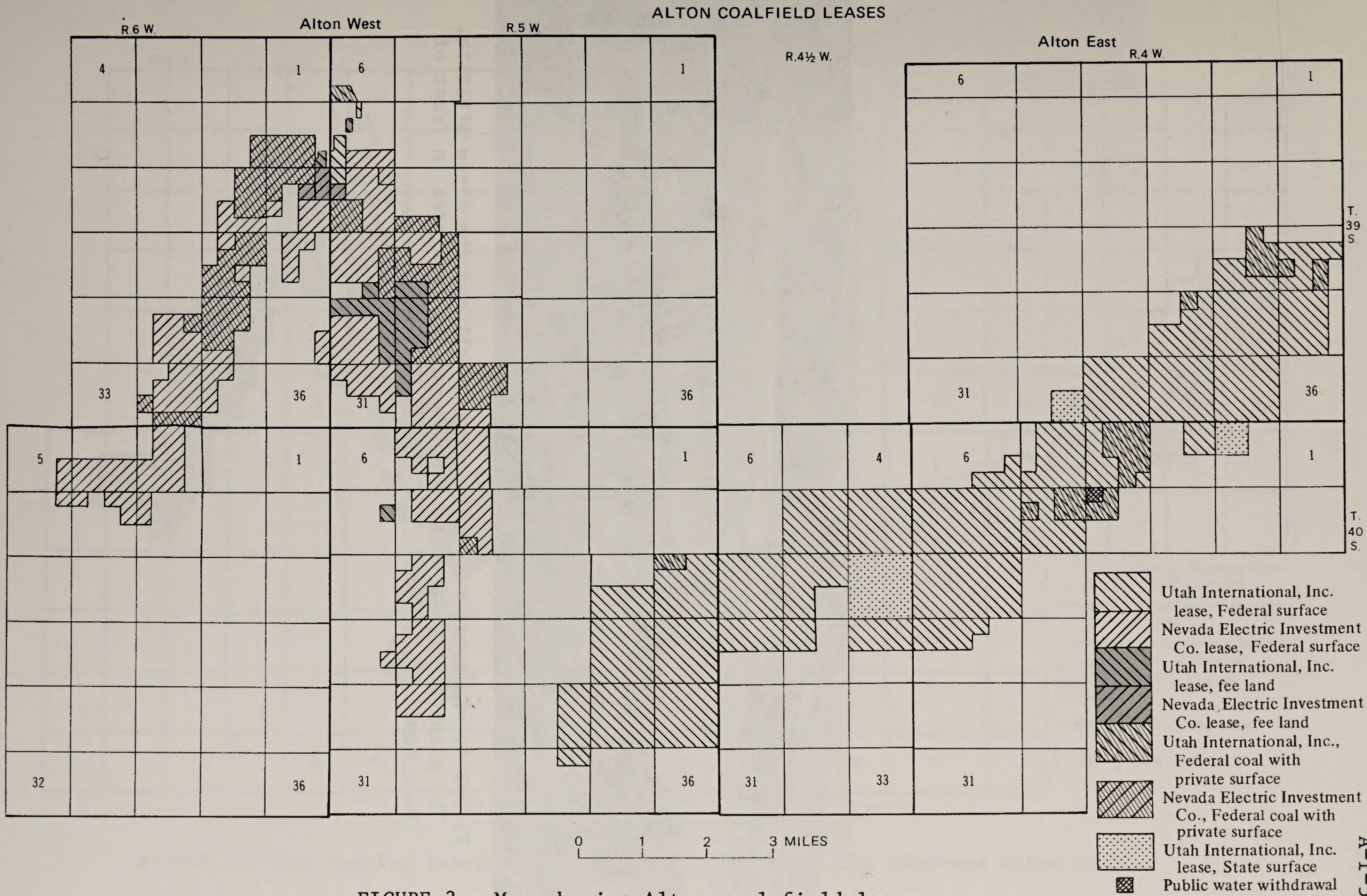

ALTON COALFIELD LEASES
Alton West
Alton East
R.6 W.
R.5 W.
R.4½ W.
R.4 W.
T. 39 S.
T. 40 S.
4
1
6
1
33
36
31
36
5
1
6
1
6
4
6
1
32
36
31
36
31
33
31
6
1
31
36
0
1
2
3 MILES
Utah International, Inc. lease, Federal surface
Nevada Electric Investment Co. lease, Federal surface
Utah International, Inc. lease, fee land
Nevada Electric Investment Co. lease, fee land
Utah International, Inc., Federal coal with private surface
Nevada Electric Investment Co., Federal coal with private surface
Utah International, Inc. lease, State surface
Public water withdrawal

FIGURE 3.--Map showing Alton coal field leases.

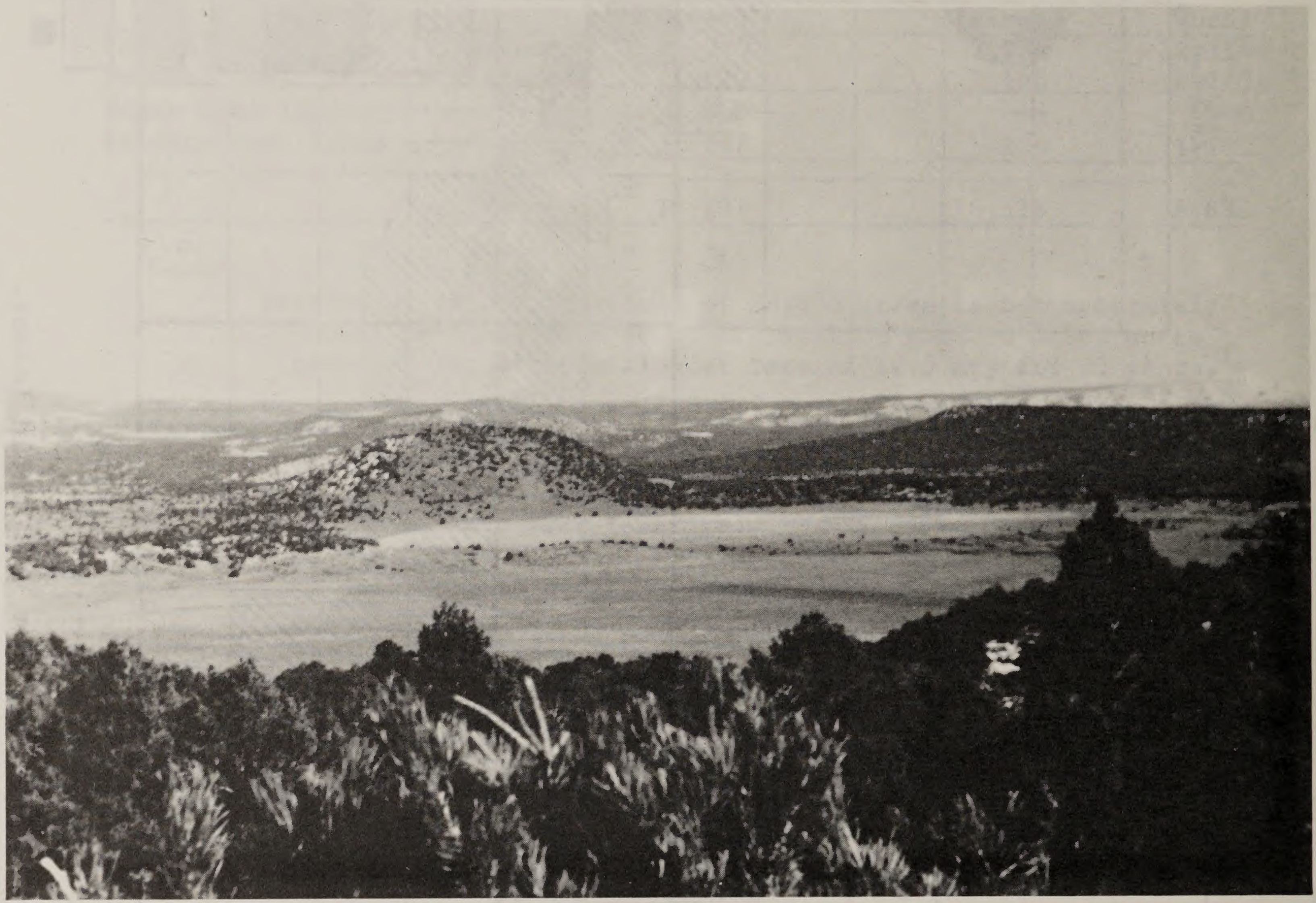


FIGURE 4.--Eastward view toward Bald Knoll and the Alton minesite. The plantsite would be in the cleared dry farm area in front of Bald Knoll.

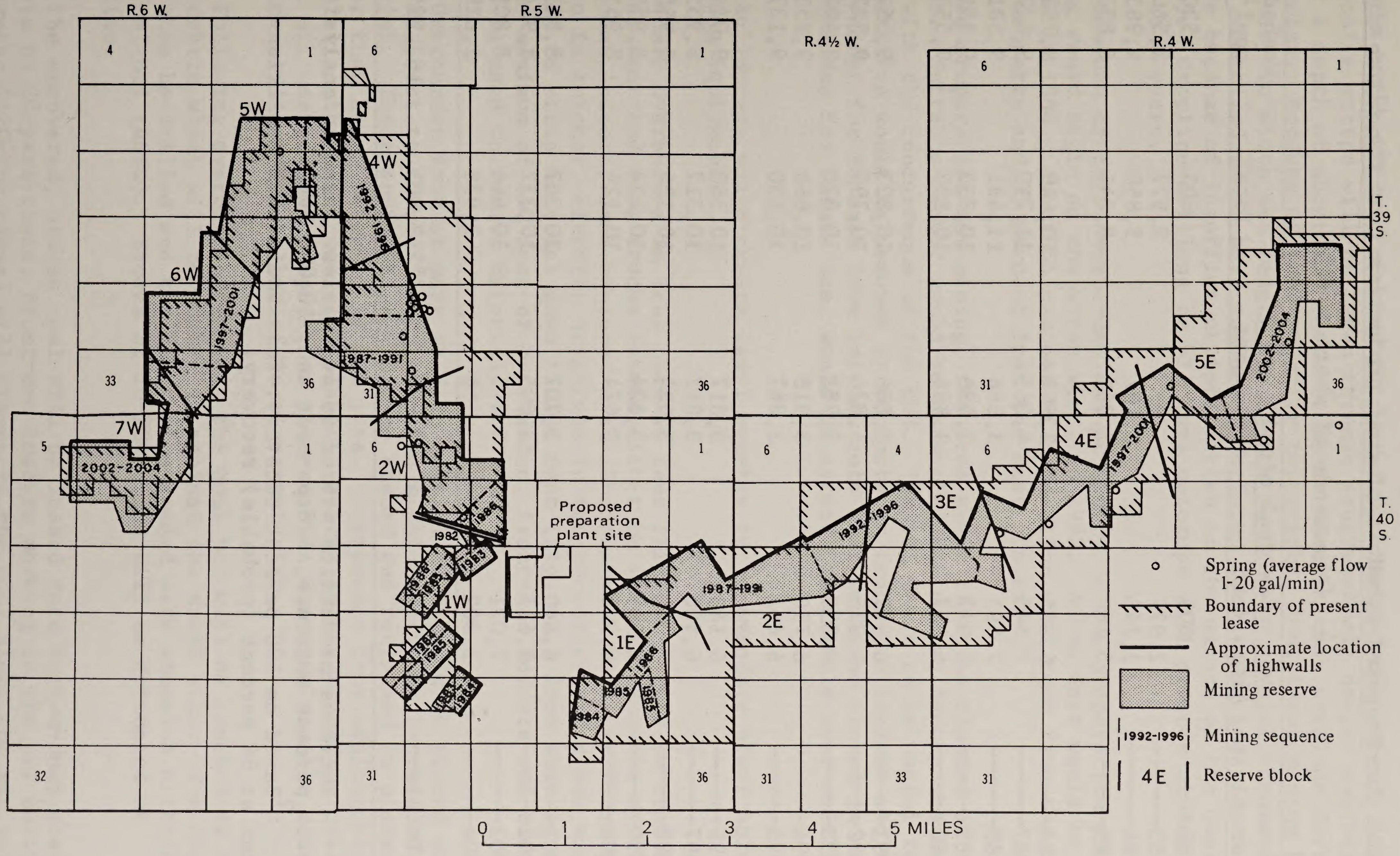


FIGURE 5.--Map showing reserves and mining sequences of the proposed Alton mine.

TABLE 2.--Proposed schedule of coal production from the Alton mine

[thousands of short tons]

Year	Raw coal mined		Total	Washed coal[1]
	Alton West	Alton East		
1982------	605	--	605	520
1983------	2,977	--	2,977	2,560
1984------	3,743	2,107	5,850	4,985
1985------	5,180	2,861	8,041	6,853
1986------	6,985	3,664	10,649	8,759
1987------	7,645	4,065	11,710	9,627
1988------	7,595	3,886	11,481	9,581
1989------	6,947	3,886	10,833	9,551
1990------	6,947	3,886	10,833	9,551
1991------	6,947	3,886	10,833	9,551
1992------	6,925	3,874	10,799	9,522
1993------	6,839	3,981	10,820	9,402
1994------	6,750	3,918	10,668	9,253
1995------	6,663	3,867	10,530	9,137
1996------	6,543	3,817	10,360	9,014
1997------	6,500	3,817	10,317	8,955
1998------	6,500	3,624	10,124	8,955
1999------	6,500	3,624	10,124	8,955
2000------	6,500	3,624	10,124	8,955
2001------	6,660	3,707	10,367	8,955
2002------	6,637	3,695	10,332	8,924
2003------	7,021	3,645	10,666	8,805
2004------	2,902	56	2,958	2,629
Totals--	138,511	73,490	[2]212,001	182,999

[1] Includes production stored in stockpiles. Assumed analysis: 16.14 percent moisture, 7.8 percent ash, 10,088 Btu/lb.

[2] Based on 100 percent recovery; this would be 200 million tons at 94 percent (probable) recovery.

est the outcrop first, working in strips parallel to the outcrop trend. Successive strips will be taken through progressively deeper overburden until a depth of about 150 feet, or other limitations, preclude further stripping. Because of the irregular topography, individual mining blocks will vary in width and length from a few hundred to several thousand feet. Detailed plans have not been developed for mining individual blocks because of insufficient information on the nature of the coal bed(s). Cropline-drilling on all coal outcrops will precede mining by 1 to 3 years.

Because of thin overburden and proximity to the preparation plant, mining would begin on the Alton West, in 1982. Alton East would be opened in 1984. About 65 percent of production will come from the west property and 35 percent from the east property.

In preparation for mining, the area would first be cleared of vegetation. Suitable timber would be harvested for use as fenceposts or sold with the concurrence of the BLM. Topsoil shown to be useful for revegetation would be removed by scrapers or front-end loaders and trucks and, except for topsoil from initial cuts that would be stored in undisturbed areas for future use, would be spread immediately over refilled pits.

Bulldozers would create level benches to accommodate blast hole drilling equipment.

Where overburden is less than 50 feet thick, it would be removed in 85-ton, rear-end dump trucks loaded either by electric shovels or diesel front-end loaders, each equipped with 15-cubic-yard buckets. Where overburden is thicker, electric draglines in the 60-cubic-yard class would be used to strip material down to 100 feet (fig. 6). From that level to the maximum of 150 feet of overburden, front-end loaders and trucks would be used to remove material.

Overburden from as many as five initial cuts would be placed on land adjacent to the cut, some of which might have to be benched to hold material. These spoil piles would be shaped and reclaimed in place rather than being returned to the pits. Overburden from additional cuts parallel to the first would be placed directly in the preceding cut. Also, all waste rock, preparation plant wastes and unsalvagable construction materials would be buried in mined-out pits.

Following overburden removal, the coal bed will be cleaned of any rock debris which will be pushed up against the spoil pile. The coal will then be drilled and the blastholes loaded with ammonium nitrate and fuel oil (ANFO). Blocks of 20-200 holes will be detonated at one time.

The uncovered, broken coal will be loaded into bottom-dump coal haulers by 20-yard-class, front-end loaders working in the pit bottom. The trucks (120-ton class) will transport the coal along the pit bottom,

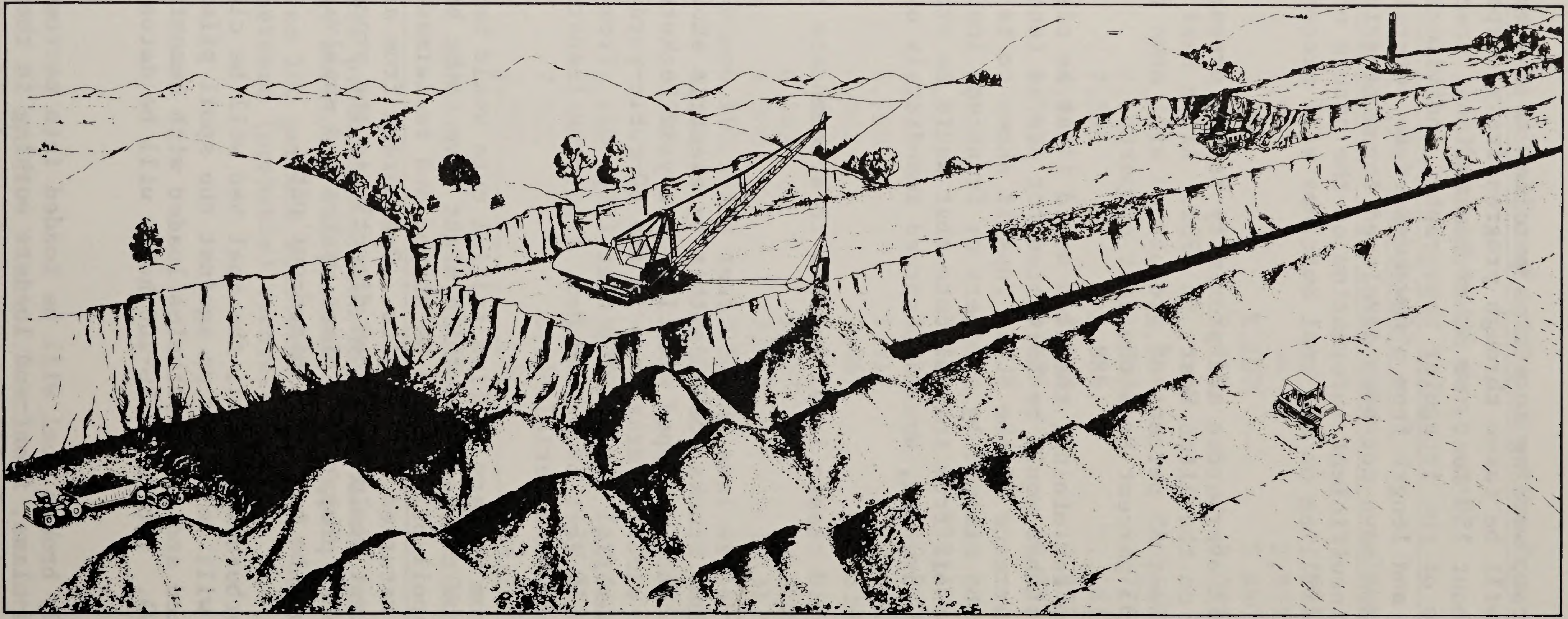


FIGURE 6.-- Sketch showing a typical dragline strip-mining operation.

out the ramp, then along the major road haul system to the preparation plant's raw coal receiving hopper.

Mudstones underlie the coal bed locally. Where mudstone causes soft bottom conditions, coal loading operations will be conducted by equipment positioned on top of the coal. Loading equipment will then consist of a large (8 to 15-yard) hydraulic backhoe.

Coal loading and hauling activities will be conducted two shifts per day, 5 days per week. The haul fleet will increase with the phased mine expansion and continue to increase gradually as mining becomes more distant from the washplant. The number of haul units required during this period is projected to vary from 15 to 25 with about 300 trips per day from the pits to the preparation plant.

Ground water may be encountered within pit areas in some instances. Ditching will direct the water to a sump, or when conditions permit, in-pit grades will be used to direct flow out of the pits naturally. If conditions require pumping for water removal, small submersible pumps will be used. Water discharged from pit areas will be diverted by pipes, culverts, and open ditches to settling ponds designed to allow settling of suspended solids. If necessary to meet effluent standards, water will be treated before it is discharged to natural drainages. Some of this water may be used for road dust suppression.

In pits crossing drainages with flows large enough to endanger mining operations, diversion works will be constructed to lead surface waters around the active area. Once mining has progressed to a point where diversion of inflow is no longer required, the diversion structures may be abandoned. In several major drainages, it may not be feasible to divert flows; in such cases, a block of undisturbed ground protecting the present channel will be left between adjacent pits.

Construction of haul roads to the initial mining area west of the plantsite will be required in 1981, followed 1 year later by haul roads into the eastern mining area to service the mining operation scheduled to begin production in 1984. The completion of each new segment of haul road will be scheduled to correspond to the progress of mining operations outward from the initial areas of production. Approximately 50 miles of truck haul roads will eventually be constructed for delivering coal from the mining operations to the dump hopper at the central preparation plant.

These roads will be built on compacted fill or cut areas approximately 70 feet wide for haulage trucks or 100 feet wide where needed for draglines. Sub-base and surfacing material will be applied to a depth of 6 to 18 inches. Local materials will be used as much as possible and may consist of gravel, clinker, or crushed rock. Where traffic warrants, a 45-foot wide, 4- to 6-inch layer of finely crushed rock treated with a petroleum or chemical agent may be used as surfacing. Culverts will be installed at all major drainages to prevent interruption of present drainageways or the creation of impoundments. All disturbed areas associated with the construction of the haulage roads will be reclaimed. This includes saving and redistributing available topsoil on road cuts or fill slopes.

During the course of mining, various vehicular roads will be constructed to serve a specific function and will be abandoned within 1 or 2 years. Many of these roads will be in the path of mining, and, as mining progresses, will be removed by stripping operations.

Existing county-maintained roads lead through the general area, but will require extensive reconstruction and surfacing to be adequate for the anticipated high density of use. Primary employee access to the project area is expected to be via the Johnson Canyon Road. However, most large equipment will be shipped by rail to the Richfield area to the north, then trucked through Alton to the Bald Knoll Junction. The main plant access highway will be needed prior to plant construction, which is scheduled to begin in late 1979 and to be well underway in early 1980.

The mine itself would use about 160 acre feet of water annually for dust suppression, sanitation, culinary purposes, and so forth. This water would come from ground-water seepage salvaged from the pits.

Electric power would be required to run draglines, shovels, and drills. The power would be available at the processing plant which is a component of the Allen-Warner Valley energy system (regional EIS, Part 1). The power would be distributed by 69 kV lines to portable substations at each pit. It then would be stepped down to 6,900 volts for use at the site.

Mine powerlines would be strung from wooden poles approximately 500 feet apart. These lines and accompanying light-duty service roads would be extended and removed as required. A maximum of perhaps 600 acres would be disturbed by powerline rights-of-way over the life of the mine; they would be reclaimed after abandonment.

The offices, shops, warehouse, coal preparation plant, stockpiles, storage yards, and associated facilities are discussed as part of the Allen-Warner Valley energy system.

The company has estimated that 621 would be employed over 23 operational years. This is essentially equivalent to 75 tons per manshift, including support personnel, which reflects the current manpower equivalency for similar western strip mines. A construction force of as many as 85 would be needed for 8 years at start-up.

Reclamation of disturbed areas and regrading of highwalls will take place as mining progresses, resulting in only a small portion of unreclaimed land at any one time (table 1).

C. ENVIRONMENTAL PROTECTION AND RECLAMATION

UII has not yet developed a detailed reclamation plan. To meet applicable Federal standards, substantial revision is required to reclamation proposed by the company and paraphrased below:

The goal of any proposed reclamation plan will be to return the land to a productive level at least equal to the premining situation on public lands and to assist private landowners in achieving desired land use. Generally, this would mean emphasizing domestic livestock and wildlife use. The details of the reclamation program will be prepared by the company in consultation with the surface managing agency as plans for mining each reserve block are prepared.

Reclamation would begin with removing and storing suitable topsoil. If possible, this topsoil would be used immediately on regraded spoils. If the spoil required stockpiling, it would be stabilized with rapid-growing plant species. Topsoil suitability would be determined by chemical and physical properties, depth, location, and economic feasibility.

Spoil piles would be shaped and regraded by suitable equipment as soon after mining as practicable. Regrading would be done on contour to reduce erosion. Slope angles, including those of headwalls, would be limited to a maximum of 3 to 1. The result would be a gently rolling surface.

Erosion would be controlled during mining and reclamation. Control measures might include limiting of slope angles, use of mulch, chips, straw, or asphalt, channeling of drainages, and use of retention basins to retard runoff. Control during reclamation might include contour furrowing, pitting, terracing, mulching, and the use of check-dams. Surveys would be made to determine the type of mulch that best suits local needs and best methods of application.

Soil amendments are being considered for use in revegetation. These would be used as needed and in accordance with the results of on-going tests.

Seeding most likely would be done in the fall to take advantage of winter precipitation. Seeding would be by seed drill on the contour, where feasible; otherwise, broadcast seeding would be used.

A mixture of grasses, forbs, herbs and shrubs would be planted to assure a proper food supply for domestic and wild animals throughout the year (table 3). Shrub transplants would be made only if experiments are successful.

TABLE 3.--Potential revegetation species in the Alton mine area

Grasses	Forbs	Shrubs
Tall wheatgrass	Cicer milkvetch	Utah seviceberry
Intermediate wheatgrass	Utah sweetvetch	Black sagebrush
Sodar streambank wheatgrass	Alfalfa	Big sagebrush
Western wheatgrass	Sweetclover	Mountain mahogany
Mountain brome	Gooseberry-leaf globemall	Rubber rabbitbrush
Russian wildrye		Green ephedra
Indian ricegrass		Winterfat
		Antelope bitterbrush
		Gambel oak

Wildlife and livestock would be fenced out of seeded or planted areas until vegetation is established. Once vegetation was established, grazing would be regulated, so as not to exceed carrying capacity.

D. LEGALLY ENFORCEABLE MITIGATING MEASURES

Planning and environmental controls that govern and importantly relate to the proposed action are in chapter III of the regional EIS, part 1. Total mining operations will be conducted in accordance with Federal and State laws and regulations, and State approval of the proposed actions with regard to State environmental laws will be required before approval of the mining plan.

The mining and reclamation plans included in this statement were submitted for review prior to the promulgation of initial regulations (30 CFR 700) required under Section 502 and 523 of the Surface Mining Central and Reclamation Act (SMCRA) of 1977 (P.L. 95-87) and have not been officially reviewed for compliance therewith. Therefore, the mining and reclamation plans may not reflect the requirements of the initial regulations. However, in this statement the applicable initial regulations are considered as a required Federal mitigating measure. The operator has been requested to revise the mining and reclamation plans in accordance with the applicable initial regulations. As soon as the mining and reclamation plans are revised they are to be submitted to the Office of Surface Mining Reclamation and Enforcement (OSM) which shall determine compliance with the requirements of Federal regulations at 30 CFR 211 and 30 CFR 700. The mining and reclamation plans cannot be approved until they conform to all applicable requirements.

The revised Utah State Antiquities Act (1977) provides for the preservation and (or) protection of paleontological values on State land. In the event that paleontological resources are discovered on federally owned lands, proper Federal authorities shall be notified and their recommendations followed.

Mine company monitoring of water levels in wells, discharges of springs and seeps, and quality of waters in the mine areas will be necessary to determine effectiveness of environmental protection measures. Water levels and spring flows will be measured to determine the area affected by mining. The company will provide substitute water supplies to replace supplies depleted as a result of mining as required by the State of Utah (Title 73-3-23) or by OSM. Any refuse piles will be contained and released in accordance with State and EPA regulations.

The operator shall employ the best management practices to reduce fugitive dust regardless of predicted concentrations during operation. Thus the mining plan and the Department's approval thereof will use an appropriate combination of the following fugitive dust controls:

- Pavement or equivalent stabilization of all haul roads used or in place for more than one year.

- Treatment with semi-permanent dust suppressant of all haul roads used or in place for less than one year and for more than two months.
- Watering of all other roads in advance of and during use whenever sufficient unstabilized material is present to cause excessive fugitive dust.
- Reduction of fugitive dust at all coal dump (truck to crusher) locations through use of negative pressure bag house or equivalent methods. Inclusion of conveyor and transfer point covering and spraying and the use of coal loadout silos.

Because of the erodibility of the area, the final configuration of the land will be slightly undulating, to minimize long flow reaches and concentrations of runoff. The soil surface will be treated by a machine, such as the Arcadia Model B contour furrower or gouger. For additional erosion control, 2 tons of straw per acre will be applied during seeding. Soil loss will be held to less than 50 percent above that of premining loss. Before seeding, the recontoured overburden and soils will be ripped to a depth of 18 inches to promote plant growth.

The present nearly pure stand of pinyon and juniper provides very little forage for wildlife or livestock. Although it is expected that in time pinyon and juniper will reoccupy the area, it may be possible to greatly improve the habitat for large herbivores. Because the area will continue to be used for both domestic animals and wildlife after mining, a variety of both herbaceous and woody species will be seeded or transplanted. Additional species suitable for revegetation include the following:

Grasses:	Fairway and standard crested wheatgrass Bluebunch wheatgrass Pubescent wheatgrass Bottlebrush squirreltail
Forbs:	Chickpea milkvetch Arrowleaf balsamroot Small burnet Sicklepod milkvetch
Shrubs:	Fourwing salt-brush Cliffrose Curlleaf mountain mahogony Woods rose Golden current

About 20 pounds of seed mixture per acre will be used if seed is broadcast, and 12 pounds if drilled. All seeding and planting will be timed to take advantage of available soil moisture as well as precipitation patterns. To insure establishing permanent vegetation, supplemental irrigation may be required, especially on south-facing slopes. Maintenance fertilization will be necessary if productivity falls below premining levels. The revegetated areas will be protected until the new plants are fully established (3-5 years) all fences shall be constructed according to specifications for wildlife areas.

Endangered and threatened plants will be protected unless or until they are removed from the official list.

Shelter belts will be established, and browse species of plants for wildlife will be transplanted or seeded. Revegetated forage areas will be screened from main roads by vegetation or topography to ensure maximum usability by deer. Construction of roads in riparian zones will be avoided.

Bald eagle roostsites and golden eagle nests, if located, will be classified as crucial areas, and any use detrimental to the eagles will be prevented.

Several measures will be required to protect delicate topographic features and visitor experience levels along the south rim of the Paunsaugunt Plateau (particularly Yovimpa and Mill Creek Points) within and near Bryce Canyon National Park. UII, at its expense and in cooperation with the National Park Service, Bureau of Land Management, and USDA Forest Service, will do the following:

- During the first 20 years mining, avoid east end of east mining area. The 20-year interim provides an opportunity to study potential impacts to topographic features along the south rim of the Paumsaugunt Plateau and to adjust blasting operations accordingly.

- Establish monitoring stations (vibration monitors and decibel meters) at predetermined locations along the south rim of the Paunsaugunt Plateau before any blasting operations.

- Study and record air blast, vibration, and noise levels throughout the life of the project.

- Systematically examine topographic features for indication of premature damage, prior to and immediately after blasting at distances from geologic formation that are considered critical.

- Adjust blasting so as to eliminate any problems (for example, reduce the number of holes/delay, increase delay time, use decking, employ different bench heights, etc.) provided studies indicate air blast, vibration, or noise could approach levels that would prematurely raze topographic features or adversely impact visitor experience levels.

The Alton mine proponents and the appropriate Federal authorizing office will comply with the basic 1906 Federal Antiquities Act (P.L. 59-209; 34 Stat. 225), the National Historic Preservation Act of 1966 (P.L. 89-665, 80 Stat. 915, 16 USC section 470 f, as amended, 90 Stat. 1320), the

Historical and Archeological Data Preservation Act of 1974 (P.L. 93-291), and the Advisory Council's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800) prior to approval of any undertaking which will affect cultural properties included in or eligible for inclusion in the National Register of Historic Places.

The Bureau of Land Management, Utah State Director, and the Utah State Historic Preservation Officer have entered into a memorandum of understanding which sets forth measures the Bureau will undertake in regard to the protection of cultural resources on public lands. The principal point of the agreement is that the proponent will intensively survey project areas prior to any disturbance. If any sites are found to be of National Register significance, the project will either have to be altered so as to avoid the site(s) or provide for the preservation of data from the site(s). A cooperative agreement between the USGS and BLM that has the same effect is for "protection of cultural resources related to onshore mineral lease operations exclusive of oil, gas, geothermal resources, and oil shales."

CHAPTER II

DESCRIPTION OF THE EXISTING ENVIRONMENT

A. NATURAL ENVIRONMENT

1. Climate

The general climate of the area is described in the regional EIS, part 1, chapter II. Average monthly temperatures range from slightly less than 30°F in January to about 65-70°F in July and August. Temperature extremes usually range from about -20°F to more than 90°F. Freezing temperatures are common from mid-September through May. Average annual precipitation is about 16 inches per year with the maximum occurring in winter and summer. Maximum snow depths average about 1 foot and snow accumulations usually melt fairly rapidly.

2. Land

a. Topography

The proposed mine is located at the southern base of the Paunsaugunt Plateau (fig. 1). Alton West bounds the east, north, and west sides of the Alton Amphitheater, whereas Alton East follows a northeast-trending ridge (fig. 7). The coal to be mined is 6,500 to 7,200 feet above sea level. Slopes approach the vertical along water courses and escarpments but generally are less than 40 percent.

b. Geology and minerals

The entire mine area is underlain by the coal-bearing Dakota Sandstone and Tropic Shale (fig. 8). Valley floors are underlain by Quaternary alluvium. Bald Knoll (fig. 4), a volcanic cinder cone, and basaltic flows of probable Quaternary age occur on the west edge of the Alton East mine area. Little is known about paleontologic resources at the minesite.

The coal field lies in a broad, gentle syncline plunging N. 30° E. and bounded on two sides by faults. The Sevier fault forms the west boundary of the field (fig. 7); the west side of the fault is downthrown 1,000 to 2,000 feet. The Paunsaugunt fault forms the east border of the field; it is downthrown to the west 100 to 500 feet. A third fault, the Bald Knoll fault, is downthrown 550 feet to the east and lies between Alton West and Alton East.

Coal in the Smirl coal zone is the only economic mineral known on the lease. Although the leasehold is covered with Federal oil and gas leases, no exploration holes have been drilled. The area southwest of Alton extending west into Dixie National Forest has an identified but unevaluated geothermal potential. Some sand, gravel, cinders, and clinker

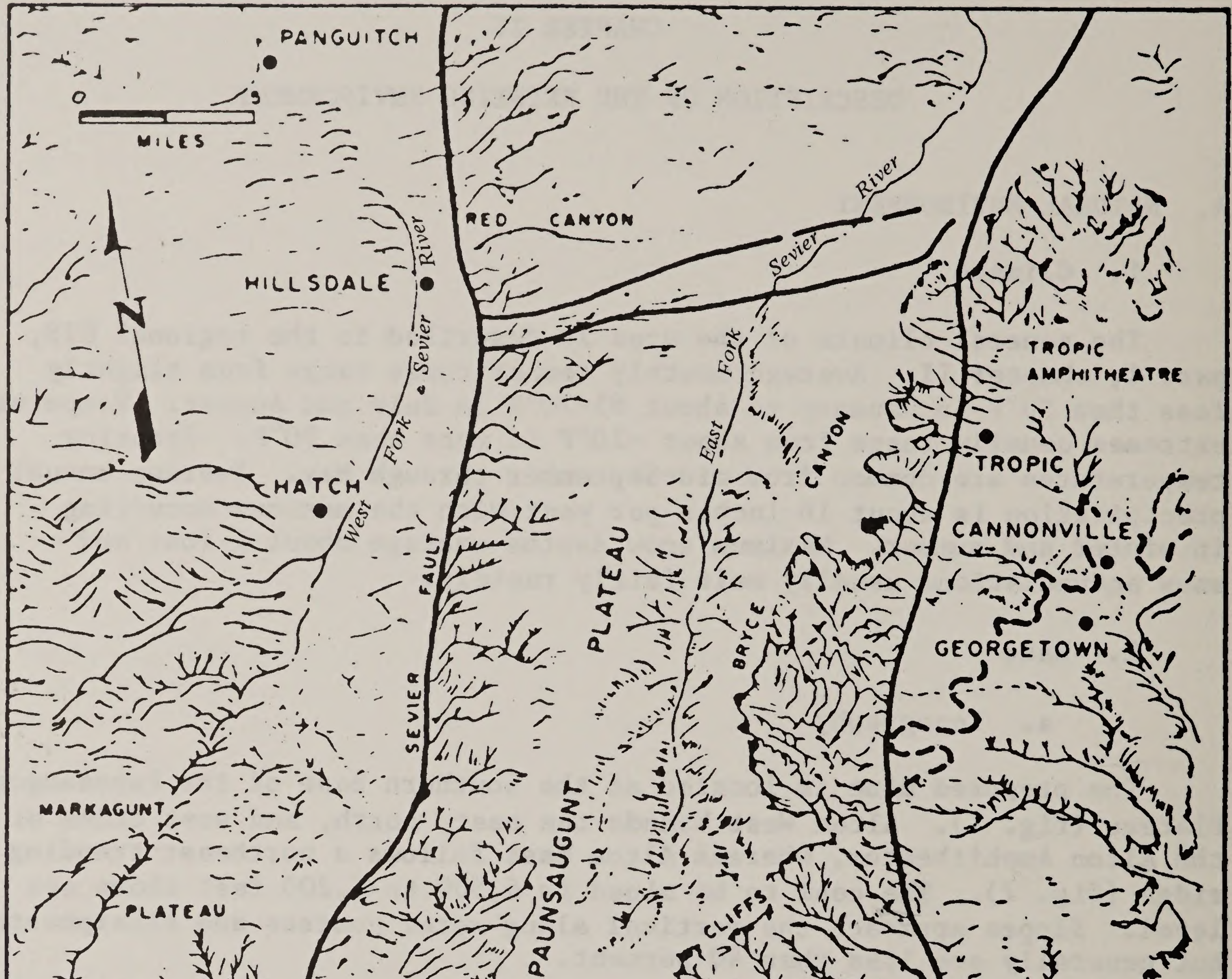


FIGURE 7.--Map showing physiography of the Paunsaugunt Plateau area, Utah.

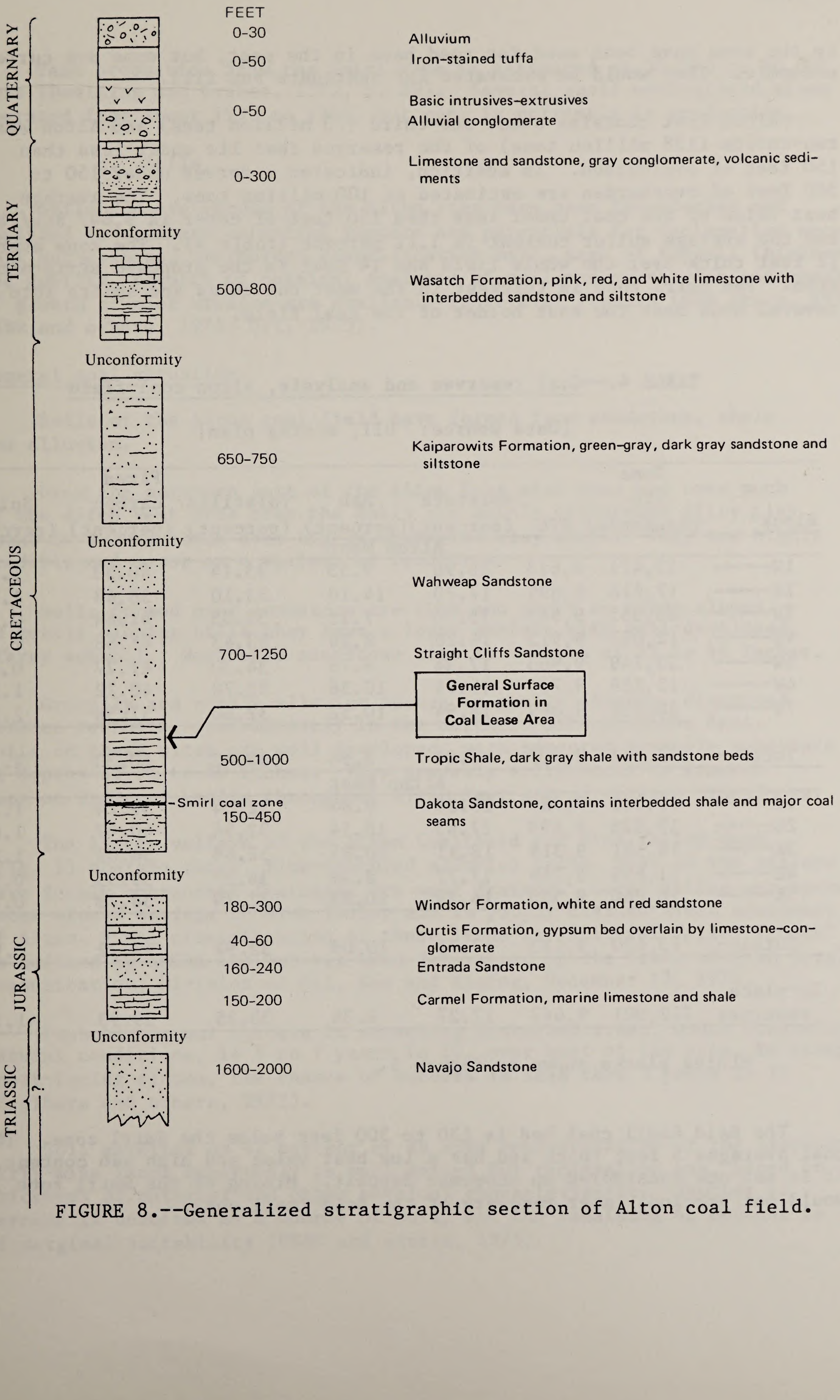

QUATERNARY
TERTIARY
CRETACEOUS
JURASSIC
TRIASSIC
?
FEET
0-30
Alluvium
0-50
Iron-stained tuffa
Basic intrusives-extrusives
0-50
Alluvial conglomerate
0-300
Limestone and sandstone, gray conglomerate, volcanic sediments
Unconformity
500-800
Wasatch Formation, pink, red, and white limestone with interbedded sandstone and siltstone
Unconformity
650-750
Kaiparowits Formation, green-gray, dark gray sandstone and siltstone
Unconformity
Wahweap Sandstone
700-1250
Straight Cliffs Sandstone
General Surface Formation in Coal Lease Area
500-1000
Tropic Shale, dark gray shale with sandstone beds
-Smirl coal zone
150-450
Dakota Sandstone, contains interbedded shale and major coal seams
Unconformity
180-300
Windsor Formation, white and red sandstone
40-60
Curtis Formation, gypsum bed overlain by limestone-conglomerate
160-240
Entrada Sandstone
150-200
Carmel Formation, marine limestone and shale
Unconformity
1600-2000
Navajo Sandstone

FIGURE 8.--Generalized stratigraphic section of Alton coal field.

in the area have been used for road base in the past, but none are currently economic. They would be excavated for aggregate and fill.

Alton East contains about one-third (73 million tons) and Alton West two-thirds (138 million tons) of the reserves that lie under less than 150 feet of overburden. In addition, indicated reserves under 150 to 350 feet of overburden are estimated at 100 million tons. The average heat value of the coal under less than 150 feet of cover is 9,647 Btu/lb, and the average sulfur content is 1.11 percent (table 4). The zone averages 12 feet thick over the whole field and 14 feet in the proposed strip-mining area. The Smirl zone is thickest in the west but thins and splits into several beds near the east border of the coal field.

TABLE 4.--Coal reserves and analysis, Alton coal field

[Data source: UII, mining plan]

Block[1]	Tons (in thousands)	BTU	Moisture (percent)	Ash (percent)	Volatiles (percent)	Fixed carbon (percent)	Sulfur (percent)
			Alton West				
1W-----	15,471	9,613	16.96	9.53	33.14	40.33	1.27
2W-----	17,918	9,095	17.70	14.10	33.10	36.68	1.76
3W-----	33,355	9,943	15.76	7.15	33.35	41.44	0.92
4W-----	12,007	9,913	16.26	8.26	33.43	41.68	1.10
5W-----	33,749	9,963	17.34	6.78	34.30	41.27	0.73
6W-----	15,259	9,724	15.74	10.38	32.78	40.72	1.31
7W-----	10,752	9,069	18.94	10.52	32.66	37.56	2.21
Total--	138,511	9,707	17.04	8.94	33.42	40.30	1.18
			Alton East				
1E-----	12,322	9,385	18.28	9.84	32.04	39.14	1.11
2E-----	19,828	9,698	17.45	10.14	32.94	40.47	1.09
3E-----	18,581	9,318	18.11	10.85	32.88	38.02	1.20
4E-----	11,899	9,749	17.77	8.39	34.17	39.53	0.54
5E-----	10,860	9,530	16.79	10.83	32.74	38.73	0.73
Total--	73,490	9,533	17.71	10.09	32.94	39.22	0.99
In-place reserves	212,001	9,647	17.27	9.34	33.25	39.93	1.11

[1] Mining blocks shown on figure 5.

The Bald Knoll coal bed is 130 to 300 feet below the Smirl zone. This coal averages 5 feet thick and has a low heat value and high ash content. It is not now considered an economic deposit. Mining of the Smirl zone would not preclude later recovery of the Bald Knoll coal.

Past production from the Smirl zone is estimated at 35,000 to 50,000 tons (Doelling and Graham, 1972, p. 29). Several small underground mines operated from about 1930 to 1969, but none is currently in production.

c. Soils

Soils and overburden of the Alton area have been inventoried and analyzed to evaluate potential impacts and potentials for reclamation success Soil survey maps, overburden classification maps, maps of topsoil thickness and quality, results of chemical analyses of soil and overburden and results of growth chamber studies are available in several reports (SWA group, 1975; USBR and others, 1975; UII, 1975).

General soil situation

Soils of the Alton coal field have formed from sandstone, shale and alluvium.

Over the northern part of the Alton East mine area and over much of the Alton West mine area the soils are mainly calcareous silty clay about 30 inches thick over highly weathered clay shale. They are highly erodible and occur on a variety of landforms.

Soils formed over sandstone are thin and rocky on steep slopes. On gently sloping hills they have a loamy surface with well-developed clayey subsoil. Weathered sandstone lies at a depth of 35 to 40 inches.

Gravelly and cobbly alluvium occurs on gently sloping, dissected terrace remnants, predominantly in the northern part of Alton East. Soils on these sites are well developed, with cemented gravelly substrata at depths of 25 to 40 inches. Very gravelly soils occur as remnant caps on isolated knolls throughout Alton East and on terrace sideslopes.

The larger valleys of the Alton Coalfield and Sink Valley Wash (fig. 1) contain thick, fine-textured alluvial soils. Most of the valleys have deeply entrenched drainages are well drained. Local saline wet spots occur around springs in Sink Valley and in poorly drained areas southwest of Alton. Final classification of these lands as "alluvial valley floors" as defined by SMCRA has not yet been determined by the State of Utah Coral Communication, Division of Oil, Gas and Mining, December 13, 1978.

Probable annual success in reseeding disturbed areas, under otherwise natural conditions, is 5 to 7 years in 10, over most of the area. On steep, south-facing slopes, the chance of success is less than 3 years in 10 (Hagihara and others, 1972).

Soil material on 42 percent of an area representative of the proposed strip-mine lands reportedly is well suited for reclamation use, based on thickness of material and other physical characteristics. Another 17 percent is unsuited as a source of soil, and the remaining 41 percent is of marginal suitability (USBR and others, 1975).

Natural sediment yield is estimated to range from 0.2 to 1.0 acre-feet per square mile per year over most of the area. On exposed clayey soils on steep slopes, sediment yield is estimated to exceed 3 acre-feet per square mile per year (UII, 1975).

The soils are dominantly in wind erodibility groups 3 and 4 (Wilson and others, 1975, Department of Agriculture, Soil Conservation Service, 1977). The soils have a moderate to moderately high potential for movement by wind. Maximum rates could reach 25 tons per acre per year, although wind erosion rates would be lower owing to size of exposed area, surface roughness, protective cover (rock, mulch, etc.), and the period of exposure.

Overburden

Overburden materials (other than soil) above the Smirl coal zone consist of generally thick, massive beds of soft gray calcareous silt and clay shale. In some areas the overburden includes thin beds of sandstone, siltstone, carbonaceous sandstone and shale, bentonitic clay, and concretionary limestone. The overburden is divided into five general groups which have low revegetation potential (table 5).

The analytical data did not indicate trace elements in amounts potentially toxic to native plants. Nitrogen, iron, and phosphorus levels were low in all samples. The high levels of sodium and salts were considered to be within tolerance limits of native grasses. Growth-chamber studies indicated that germination of certain plants could be expected on all the overburden materials. Western wheatgrass had 100 percent germination on all the materials tested. Soils developed from shale of groups 2 and 4 would have shallow moisture penetration causing high runoff and high erosion hazards. Consequently, roots would have difficulty penetrating soils or gaining aerations.

Reclamation Potential

Two field studies to evaluate revegetation potential in the Alton area have been established through cooperation between BLM and UII and between the Intermountain Forest and Range Experiment Station and UII. These studies and analysis of environmental conditions indicate that revegetation would be successful and without severe limitations. This conclusion is based on properly managed topsoil storage and other prudent soil conservation practices (SMCRA) as outlined in the Surface Mining Control and Reclamation Act of 1977 (P.L. 95-87).

3. Water

a. Water supply

Water supplies on and near the lease are scanty. The town of Alton obtains water 2 miles north of town from three springs where water issues from sandstone beds (Cretaceous, Goode, 1964); annual usage is estimated at 15-20 acre-feet. Kanab taps a spring and five wells that are 7 miles

TABLE 5.--Physical characteristics of overburden, Alton coal field, Kane County, Utah

[Source: Utah International, Inc., 1975]

Overburden group	Lithology	Resultant soil texture	Extent	pH^1	EC^2	ESP^3	SAR^4	Possible deficiencies	Possible toxicities	Permeability	Infiltration rate	Erosion hazard	Fertility	Revegetation potential
1	Sandstone; fine-grained, light- to medium gray, moderately hard.	Sandy loam.	Limited.	8.0	4,300	26	11.83	N, P, Fe	S^6, Na	Moderately slow.	Moderately slow.	High.	Low (high pH and salts).	Moderate to low.^{5}
2	Shale; light to medium gray, soft.	Heavy clay loam or sticky clay soil.	Second most extensive.	7.7	6,100	23	20.00	N, P, Fe	S^6, Na	Very slow.	Very slow.	Very high.	Low (high pH and salts).	Low.
3	Sandstone; fine-grained, dark gray, moderately hard, locally contain carbonaceous material.	Sandy loam.	Least common.	7.5	9,000	20	26.40	N, P, Fe	S^6, Na	Moderately slow.	Moderately slow.	High.	Low (high pH and salts).	Low.
4	Shale; carbonaceous, dark-gray, soft and pliable.	Sticky, plastic, heavy clay loam or clay.	Third most extensive.	6.7	5,000	12	13.74	N, P, Fe	S^6, Na, Cl	Very slow.	Very slow.	Very high.	Low (high pH and salts).	Low.
5	Siltstone, thin-bedded, and shale; light-to-medium gray.	Mixture of sandstone and shale fragments and poorly sorted particles; sandy clay loam or sandy clay.	Most extensive.	7.9	5,500	14	15.52	N, P, Fe	S^6, Na	Very slow.	Very slow.	High.	Low (high pH and salts).	Low.

[1] Saturated paste.

[2] Saturation extract, electrical conductivity (umhos/cm).

[3] Sum of NH$_4$ OA$_c$ extractable cations, exchangeable sodium percentage.

[4] Saturation extract, sodium-absorption ratio.

[5] "On the basis of texture and laboratory data, this overburden type should be one of the most favorable media. However, when moistened and allowed to dry slightly the sandstone type forms an extremely hard crust that makes it difficult for germinating seedlings to penetrate." (Utah International, Environmental Assessment, Allen-Warner Valley Energy System, vol. V, Alton Coal Field, 1975, p. 25-30).

[6] Unknown.

north of town; the source of water is the Navajo Sandstone; annual usage is estimated at 1,000 acre-feet.

In the mine area water from shallow wells, springs, and small streams is used mainly for watering livestock and for wildlife and irrigation; the source of water is alluvium and sandstone beds (Cretaceous, Goode, 1964). When available, streamflow from Skutumpah Creek is used for irrigation about 2 miles south of the lease, where two wells also supply irrigation water from alluvium. In Johnson Canyon, several irrigation wells tap the Navajo Sandstone.

1) Surface water

The proposed mine area transects the upper reaches of Kanab Creek and Kaibab Gulch drainages, 3 or 4 miles downstream from the Sevier River Basin divide (fig. 1). All drainage on the lease is to the Colorado River--Kaibab Gulch is tributary to the Paria River, which flows to the Colorado, and Kanab Creek flows directly to the Colorado River. About 120 acres of the lease drains to the Virgin River, which also empties into the Colorado River. Most of the streams are ephemeral and flow mainly in response to rainfall or snowmelt. However, about 60 known springs on or near the lease provide small amounts of surface flow for short distances in many of the channels. Average flow of the springs is 1 to 5 gal/min.

Most of the drainages are in narrow valleys and have relatively steep slopes and high rates of runoff and erosion; many are deeply incised and have sloughing banks. Erosion is very active in most drainages.

Surface drainage totals 140 square miles--45 square miles of lease and 95 square miles upstream from the lease. About two-thirds of the total area is in the Kanab Creek drainage, and about one-third is in the Paria River drainage. Only 120 acres of lease drains to the Virgin River. The average discharge of the East Fork of the Virgin River is 18.3 cubic feet per second (cfs), and the minimum flow is 6.5 cfs (1966-76) near Glendale, Utah (USGS, 1977, p. 258). Alteration or reduction of streamflow in the Virgin River or its tributaries may be detrimental to the endangered woundfin fish found in the river. Therefore, all Federal departments and agencies with permit approval authority for proposals to alter the Virgin River flow will enter into consultation with the Secretary of the Interior (U.S. Fish and Wildlife Service) before acting on the permits (P.L. 93-205, Endangered Species Act of 1973). Operation of the Alton mine is not expected to affect the flow of the Virgin River. Thompson and Skutumpah Creeks, tributaries to Kanab Creek, flow small amounts on the lease most of the time. Recent records indicate that each has an average base flow of 0.25 cfs (180 acre-feet per year) near the southern boundary of the lease. Total annual flow of Thompson and Skutumpah Creeks was estimated at 850 and 350 acre-feet per year, respectively (USBR and others, 1975).

Drainage basins upstream from the proposed mine range in size from less than 1 to about 20 square miles. Peak discharges from the smaller basins may be as much as 1,000 cfs per square mile. Potential 50-year floodflows from the larger basins (10 square miles or more) are 1,500 to 2,000 cfs.

2) Ground water

Ground water occurs in virtually all of the rock units underlying the lease. The principal supplies in and near the lease are in the alluvium, the Navajo Sandstone, and the Entrada and Dakota Sandstones (fig. 8). Water yields are low (less than 10 gal/min) or nonexistent from thick shale, thin-bedded sandstone and limestone, and volcanic rocks; moderate (5 to 100 gal/min.) from alluvium, interbedded limestone and sandstone, and thick sandstone; and high (50-1,500 gal/min) from massive sandstone. The Navajo Sandstone is the major aquifer and may be capable of yielding more than 1,000 gal/min to individual wells. Most of the few wells, however, are shallow and tap the alluvium. Most of the developed water supplies come from springs. The quality of ground water is generally good in alluvium and the Dakota Sandstone (including the coal beds), but may be poor between the Dakota and Navajo.

Regional ground-water movement in the Dakota Sandstone and overburden is eastward and southeastward into the Paria River drainage and southward into the Kanab Creek and Virgin River drainages. Recharge to the alluvium and upper consolidated formations (including the coal beds) is from precipitation on the lease and from streamflow into the lease. Formations below the Dakota Sandstone (and the coal beds) probably obtain part of their recharge from areas more distant than the mine area. Ground water discharges from springs where the permeable beds crop out below the rim of the Paunsaugunt Plateau and along faults. A small amount of the discharge might derive from ground-water underlying the Pausaugunt Plateau, where surface drainage is northward to the East Fork Sevier River. Part of this ground water might drain southward because the topographic and ground-water divides may not always coincide. The water table is lowered (compared with levels in surrounding areas) by springs along the steep, south facing Pink Cliffs.

b. Water quality

The chemical quality of the water in streams is good upstream from the lease but generally is less good downstream (file records, USGS, Salt Lake City, Utah). Recent samples from Mill (tributary to Skutumpah Creek) Skutumpah Creeks had dissolved solids ranging from 315 to 752 mg/L, whereas samples from adjacent Thompson Creek had dissolved solids ranging from 722 to 1,740 mg/L. The difference is probably related mainly to differences in chemical characteristics of the earth materials on the watersheds; data on the overburden (UII, 1975) show considerable variability with respect to sodium-absorption-ratio, pH, and electrical conductance (table 5), relatively high concentrations of Na, NO_3, SO_4, but no toxic concentrations of trace elements. Water samples from Kanab Creek and East Fork Virgin River, collected and analyzed by the Utah State Division of Health, also indicate no toxic concentrations of heavy metals and trace elements. USGS records (Tucson, Ariz.) show that daily mean concentrations of dissolved solids range from 330 to 4,200 mg/L for Kanab Creek near Fredonia, Ariz. (1967-72), and 190 to 2,850 mg/L for Paria River at Lees Ferry, Ariz. (1964-75). Dissolved-solids concentration in the East Fork of the Virgin River near Glendale, Utah, ranged from 250 to 400 mg/L based on specific conductance measurements in 1975-76 (USGS, 1976, p. 443, and 1977, p. 528). Chemical analyses of water from four wells on or near the lease area show dissolved-solids concentrations ranging from 641 to 2,210 mg/L (USBR and others, 1975), and water from one well in sec. 8, T. 40 S., R. 4 1/2 W. contained 150 mg/L nitrate (upper recommended limit is 10 mg/L [National Academy of Sciences, 1972, p. 73]). Both surface water and ground water contain rather high concentrations of bicarbonate--values for 14 samples ranged from 236 to 572 mg/L.

Sediment concentrations are very low during base flow and very high during storm runoff. Samples taken from Thompson and Skutumpah Creeks in 1974 contained sediment concentrations ranging from 34 to 431,000 and 154 to 307,000 mg/L, respectively (USBR and others, 1975). Long-term sediment records on the Paria River at Lees Ferry show daily sediment concentrations of 1 to 780,000 mg/L (USGS, 1977), and periodic records on Kanab Creek near Fredonia show 10 mg/L (USGS, 1973) to 575,000 mg/L (USGS, 1967).

4. Air

Particulates would be the major pollutants resulting from the strip mining operations. Other pollutants such as sulfur dioxide, nitrogen, oxides, carbon monoxide, and photochemical oxidants would be negligible (AeroVironment, 1977).

Monitoring of total suspended particulates (TSP) was done at the lease area from February 1976 through June 1977. The highest 24-hour average was 53.2 $\mu g/m^3$, which is substantially below the National Ambient Air Quality Standard (NAAQS) of 150 $\mu g/m^3$. The annual geometric mean was 17.0 $\mu g/m^3$, which is substantially lower than the national standard (NAAQS) of 60 $\mu g/m^3$. Median visibilities in non-urban areas of the southwest are 65 to 80 miles (104-128 km) according to Trijonis (1978). Visibility measurements at Cedar Mountain, east of Castle Dale and 25 miles southeast of Price, Utah, have monthly averages that range from 54 miles (87 km) in April 1977, to 94 miles (150 km) in November and December of 1976 (Pueschel and others, 1978). Visual range, computed from light scattering measurements made at the Alton lease area from February 1976 and June 1977, averaged 56.5 miles (90 km) and the daily averages ranged from about 22 miles (35 km) to 86 miles (140 km) (Graham and Hovind, 1977).

The southern extremity of Bryce Canyon National Park (fig. 1) is 3 miles from the northeastern part of the proposed mining area; Zion National Park is about 25 miles southwest. Both parks are designated mandatory class I areas, where visibility is an important value.

5. Vegetation

Pinyon-juniper woodland and sagebrush-grass are the dominant vegetation types (regional EIS, part 1, chapter II) on the lease (fig. 9). Bare ground on the lease averages about 40 percent (USBR and others, 1975). The extent of types is as follows:

Vegetation type	Acres	Percent
Pinyon-juniper woodland--------	23,123	81
Sagebrush-grass----------------	2,842	10
Mountain brush-----------------	1,038	4
Agricultural land--------------	939	3
Non-productive-----------------	570	2
Grassland----------------------	124	--
Total----------------------	28,636	100

Three plants, as designated under the Endangered Species Act of 1973, were located adjacent to the Alton coal fields (Welsh, 1977). One of these is an endangered species, Astragalus serpens, and two are threatened species, Germanium marginale and Penstemon leiophyllus. Both Astragalus serpens and Germanium marginale occur with such frequency in the region as to suggest that they be removed from the list. Penstemon leiophyllus is one of the truly common plants in the area.

Over the last 5 years the lease area has had five fires. All were caused by lightning and burned a total of 2.07 acres.

6. Wildlife

Wildlife habitat on the lease and surrounding terrain supports a variety of wildlife characteristic of the pinyon-juniper woodlands of southern Utah (fig. 10) (regional EIS, part 1, chapter II). Interspersed agricultural lands and sagebrush flats provide a great diversity of species. The most common game species are mule deer, cottontail rabbit, mountain lion, mourning dove, sage grouse, and wild turkey. Less common are chukar, band-tailed pigeon, and waterfowl.

Other large mammals include coyote, bobcat, blacktailed jackrabbit, badger, porcupine, and skunk. Small mammals include a variety of bats, squirrels, chipmunks, wood rats, mice, kangaroo rats, shrews, and gophers. Bird life is varied. Many are year-round residents; some are seasonal, and others occupy the area for short periods during migration.

Studies by BLM, Utah Division of Wildlife Resources (UDWR), and others have not located any resident threatened or endangered species (BLM, 1974; Boner and others, 1977; Collier, 1975; and Porter and White, 1973). Bald eagles, an endangered species, are winter residents in the Alton-Kanab area and may roost south of Alton.

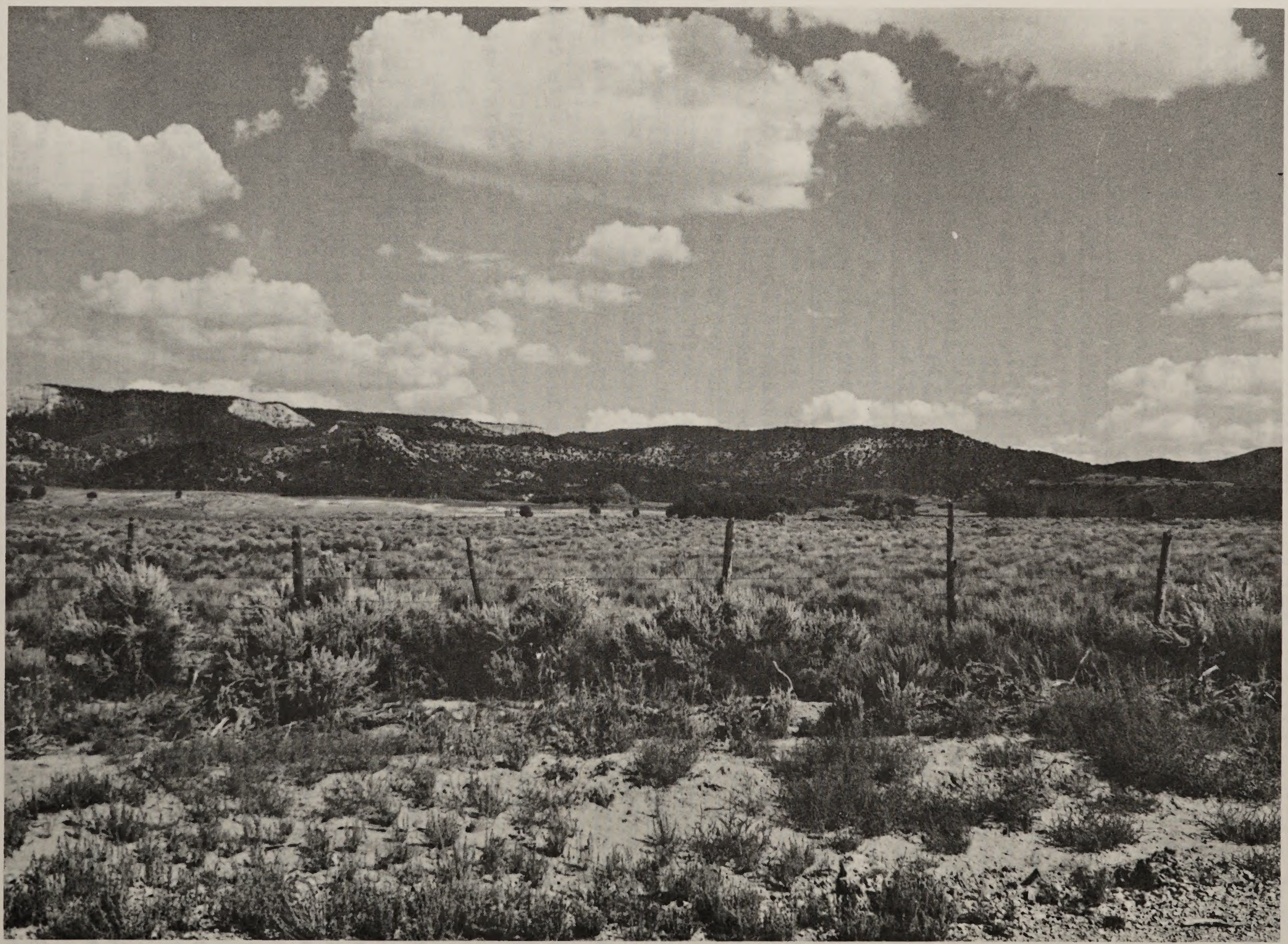


FIGURE 9.--Eastward view from State Highway 136 south of Alton toward part of the Alton East mine area. Sagebrush-grass in foreground, pinyon-juniper on slopes concealing coal beds.

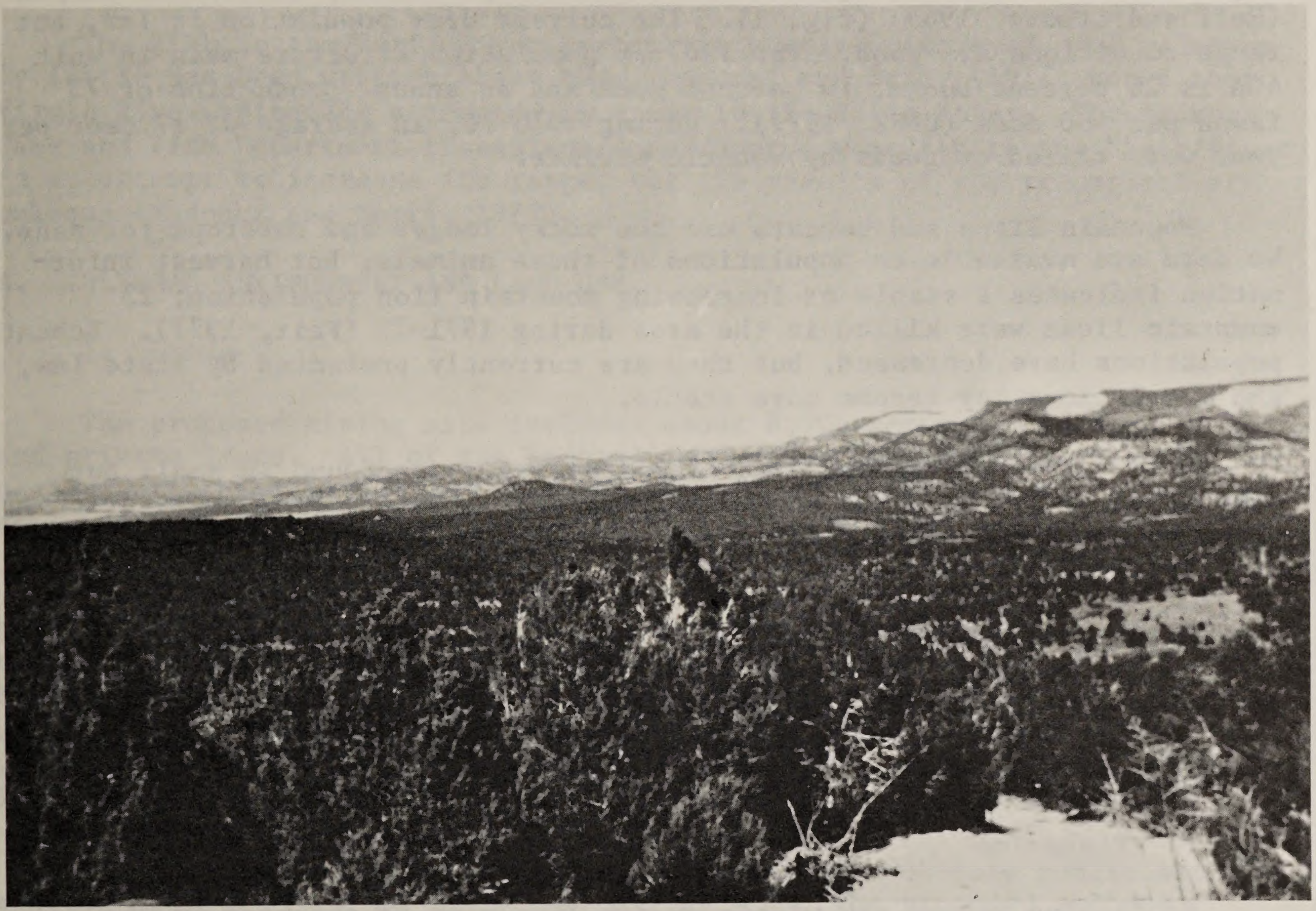


FIGURE 10.--Typical pinyon-juniper woodland in the Alton East mine area, Kane County, Utah.

The lease is on summer range in State deer herd unit 60A (Paunsaugant). This unit has 265,000 acres of summer range and 439,600 acres of winter range (UDWR, 1977). During severe winters, winter range is reduced to 299,000 acres (Huff and others, 1965). The boundary between deer summer and winter range approximately follows the southern border of the lease. Migration from summer to winter range is south through the lease. The major migration routes are along Kanab Creek, Skutumpah Creek, and Meadow Canyon (Huff and others, 1965) (fig. 1). The current deer population is low, but range conditions are good. The 1967-76 population structure mean in unit 60A is 26 percent bucks, 74 percent does and an annual production of 73 fawns per 100 does (UDWR, 1977). During 1970-76, an average of 17 deer per year were killed on roads by vehicle strikes.

Mountain lions and bobcats use the rocky ledges and outcrops for dens. No data are available on populations of these animals, but harvest information indicates a stable or increasing mountain lion population; 23 mountain lions were killed in the area during 1971-77 (Fair, 1977). Bobcat populations have decreased, but they are currently protected by State law, and populations may become more stable.

Wild turkeys, introduced several years ago, are found in small but unknown numbers. They are associated with the Mountain Brush vegetation type, where Gambel oak is predominant and mature ponderosa pine are available for roost trees.

A small population (about 50) of sage grouse lives in the area (BLM, 1974). The range of one flock in the vicinity of Alton extends into the lease south of town. Another flock has been observed at the head of Skutumpah Creek. Strutting grounds, nesting sites, and wintering areas for these flocks have not been located.

7. Fisheries

No fishing waters are within or are likely to be affected by the proposed Alton mine; however, the lease is drained by Kanab Creek, and the Virgin and Paria Rivers, some parts of which contain fish.

Kanab Creek has a 3-mile section of trout-producing waters in its headwaters, 3 miles northeast and upstream of Alton and the proposed mine. Its population of cutthroat trout is self-sustaining. No other sportfish population is known to exist in Kanab Creek.

The East Fork Virgin River has brown and rainbow trout. The Long Valley reach, from the headwaters to Orderville (fig. 1), is considered to have limited fishery values, whereas the downstream reach is considered to have substantial fishery values according to Wydoski and Berry's stream rankings. In addition to the stream value for sportfish, the flow enters the Virgin River which contains the endangered woundfin and the rare Virgin River roundtail chub. The Virgin River below the confluence of the East Fork Virgin River is of critical value (Wydoski and Berry, 1977), as it is the only stream that supports a population of the endangered woundfin.

In addition to the woundfin, the Virgin River is populated by the rare Virgin River roundtail chub and unique Virgin River spinedace, as well as a few rainbow trout. The Virgin River roundtail chub is being considered for inclusion on the endangered list. According to Cross (1975), it may be the most threatened of the three rare fishes. Fish population in the Virgin River is limited by the low flows which cause changes in water quality and reduce space for aquatic life.

The fish in the Paria River system are mostly unsurveyed, and relatively little has been written about them. Wydoski and Berry (1977) noted that Virgin River spinedace attempted to spawn in the Paria River. The Arizona Game and Fish Department transplanted endangered woundfin to the Paria River in an attempt to increase its range, but the results of the transplant are unknown (Wydoski and Berry, 1977).

B. CULTURAL ENVIRONMENT AND LAND USE

1. Lands

The proposed mining site includes about 8,300 acres of Federal, State, and private lands. All of the Federal land is administered by the BLM. The coal rights, held by UII and NEIC include virtually all of the strippable coal.

Parts of 14 BLM range allotments are within the proposed coal project. Two areas of non-irrigated pasturelands have been identified--throughout Sink Valley and immediately south of the community of Alton. Studies conducted by the Soil Conservation Service identify these two areas as nonirrigated agricultural land. No prime farmlands are identified in the lease area (oral communication, M. Boswell, M. Olsen, and A. Erickson, 1978).

The coal lease tracts include an encumbrance, a 40-acre public water reserve admministered by BLM, T. 40 S., R. 4 W. The proposed surface mining area includes part of this reserve which must be protected from contamination or reduction in size and which excludes surface mining as an appropriate land use.

All of the Federal lands and coal involved in the proposed Alton surface mine lie within the BLM's Zion Planning Unit. Development of the Federal resources must be in accordance with the Unit's April 1977 Management Framework Plan. This recommends that: coal lease tracts be developed on the basis of multiple resource use; wildlife impacts be mitigated through habitat rehabilitation; an archeological survey be completed before any development takes place; range and watershed deterioration be mitigated and these resources be rehabilitated after mining; and a visual resource inventory be developed. In addition, air and water quality would have to satisfy the criteria of the Clean Air and Federal Water Pollution Control Acts and meet National Park Service standards.

The Kane County Master Plan Update, 1976, recommends no development of Sink Valley, Johnson Valley, Glendale Bench or Skutumpah Terrace to protect the esthetic values and economy of the county. Private land owners may sell agricultural or grazing lands for homesites or industrial uses resulting from changing land priorities. The zoning ordinances of Kane County permit surface mining in all parts of the proposed project except for a 40-acre tract maintained by BLM as a public water reserve.

2. Agriculture, Range, and Timber

The proposed project is in an area dominated by agriculture. The major use is livestock grazing on Federal, State, and private lands in the vicinity of the proposed mine. From June 1 to October 31, 130 cattle graze for a total of 640 animal unit months (AUM's). Local ranchers run the stock. There is also some irrigated cropland in and around Alton and along the county road toward the bottom of Johnson Canyon. Most of this cropland produces pasture or feed.

Some commercial timber has been produced from adjacent Federal, State and private forests. The major forest type on the lease is Pinyon-juniper which is a noncommercial type.

3. Socioeconomics

Current total population near (25 miles) the proposed Alton mine is about 4,000. The area is scenic and rural, with a low population density. Kanab, the nearest large Utah community, is about 30 miles distant and has a current population of 1,500 to 1,600, whereas communities nearer the mines have populations of 200 or less.

A high degree of lifestyle similarity and of community and family stability is characteristic of communities and families in southern Utah. Most residents are of Mormon religious background.

The population of these communities and Kane County is fluctuating in a way typical of small, rural, and tradition-oriented communities in the West. Residents are adjusting to the trend from rural to urban lifestyles. This has resulted in some out-migration to find schooling and employment. It also has effected annual fluctuations in the kind and time period of employment. For example, there are more part-time jobs, and some of these jobs are seasonal, particularly agriculture, recreational, and tourist-oriented jobs. The proportion of older residents is relatively large and possibly increasing (Utah Industrial Promotion Division, 1976).

4. Transportation and Utilities

Access to the proposed Alton mine would be over U.S. 89, a two-lane highway, by Federal Aid Secondary (FAS) Route 421 up Johnson Wash (partly paved, to be upgraded), and the present one-lane graveled road, which connects FAS 421 to Glendale (fig. 1). FAS 421 had an average daily traffic (ADT) count of 30 vehicles per day in 1975. The 25-mile graded, gravel, and dirt section of this county road, and approximately 100 miles of other low-standard roads serving the lease area, are not maintained or plowed during winter months. In comparison, U.S. 89 west of Alton had an average daily traffic (ADT) count of 1,650 vehicles, and the same highway east of Kanab had an ADT count of 1,020 vehicles, yearlong in 1975 (Department of Transportation, Utah, 1975).

The nearest rail lines are at Cedar City, 43 miles to the northwest; at Marysvale, an unused terminus 78 miles north; and at Flagstaff, Ariz., 212 miles south by road.

The mine area, which is in the Garkane power service area, has no high-voltage service, but it could be served by either Garkane or Utah Power & Light Co.

Telephone service is available at Glendale, about 10 miles away (fig. 1).

5. Recreation

The lease area has limited potential for recreation opportunities and receives relatively little use in comparison to adjacent national and regional attractions (table 6). No recreation use records are maintained for the lease or immediate area surrounding it. No onsite facilities or services have been developed for recreation use and none are planned in the foreseeable future.

Present recreation uses are limited primarily to (a) driving for pleasure on secondary, low-standard roads and viewing the environment; (b) four-wheel driving on back-county roads; (c) hunting mule deer, upland game birds, small game and nongame species; and (d) gathering resource products such as firewood, pinyon nuts, Christmas trees, rockhounding, and so forth. Onsite evidence, including the lack of campsites, litter, and off-road vehicle (ORV) use, indicates that recreation use is primarily by local residents and involves daytime use and travel.

The Alton East mine area does make up a part of the recreation resource of the south rim of the Paunsaugunt Plateau. It is a part of the panoramic view as seen from Yovimpa Point by more than 100,000 annual visitors to Bryce Canyon National Park, and from other view points along the south rim of the Paunsaugunt Plateau (figs. 1, 7).

No community recreation facilities exist in the town of Alton. City parks, playgrounds, and commercial campgrounds and other facilities are available in Kanab, Mount Carmel, Orderville, and Glendale along U.S. Highway 89 (fig. 1). National and regional recreation use in the general vicinity of the lease is described in the regional EIS, part 1, chapter II.

6. Esthetics

The visual resource of the Alton coal field involves two primary viewing perspectives: (1) from the Alton amphitheater (including the town

TABLE 6.--Recreation use of facilities near Alton, Utah

Recreation use area	Administering agency	Approximate travel time from lease area	1976[1] recreation visits	Major recreation user attractions																Remarks
				Scenery	Driving	Camping	Picnicking	Hiking	Hunting	Fishing	Boating	Swimming	Nature study	Works of man	Cultural history	Archeology	Geology	Wildlife	Winter sports	
Zion National Park	National Park Service	1 hour	1,090,000 V 1,013,100 V/D	*	*	*	*	*				*	*		*	*	*	*		Use of campgrounds, roads, and trails above capacity, April thru September, annually.
Bryce Canyon National Park	National Park Service	1 hour	636,200 V 246,000 V/D	*	*	*	*	*					*		*	*	*	*	*	Use at or above capacity April thru September, annually.
Glen Canyon National Recreation Area	National Park Service	1 hour	870,340 V (Visitor days not calculated)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		Very heavy spring-summer-fall use; campgrounds, marinas, visitor center in vicinity of Page, Ariz. near carrying capacity.
Cedar Breaks National Monument	National Park Service	1 hour	411,270 V (Visitor days not available)	*	*	*	*	*					*		*	*	*	*	*	Moderate to heavy summer use, but generally below capacity.
Markagunt Plateau (Navajo Lake, Panguitch Lake et al. in Cedar City Ranger District, Dixie National Park	U. S. Forest Service	1-2 hours	296,300 V 652,800 V/D	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	Heavy summer use with roads; campgrounds, and fisheries use, above capacity on weekends. Big-game hunting in fall is heavy.
Paunsaugunt Plateau (Powell and Escalante Ranger Districts, Dixie National Forest)	U. S. Forest Service	1-2 hours	80,000 V 328,800 V/D	*	*	*	*	*	*	*			*	*	*	*	*	*	*	Summer use is heavy, but generally below carrying capacity, except for developed campgrounds.
Cockscomb, Paria Primitive Area, Paria Townsite, 3 movie sets, other areas on public lands	Bureau of Land Management	1/2-2 hours	100,000 V (Estimate-total figure not kept)	*	*	*	*	*	*				*	*	*	*	*	*		Generally below carrying capacity, but high spring and fall use of low elevation areas and for hunting.
Kodachrome Basin State Park	State of Utah		11,880 V	*	*	*	*	*	*				*		*	*	*	*		High summer use, but below capacity.
Coral Pink Sand Dunes State Park	State of Utah	1 hour	47,640 V	*	*	*	*	*	*				*		*	*	*	*		Heavy use spring and fall. Moderate use summer ORV.
Snow Canyon State Park	State of Utah	1-1/2-2 hours	130,303 V	*	*	*	*	*	*				*		*	*	*	*		Nearly at carrying capacity.
Brianhead Ski Resort	Private/USFS permit	1-1/2-2 hours	90,000 V	*	*			*	*				*	*				*	*	Heavy use winter, below capacity on week days.

[1] Recreation Use Records of Administering Agencies, 1976.

of Alton) and from secondary roads within the lease area, and (2) from various points on the south rim of the Paunsaugunt Plateau.

Any activities involved in or related to the proposed action, that would be seen from within the Alton amphitheater, would appear primarily within 0-3 miles (foreground-middleground viewing zone). The present landscape character as seen from this perspective is best described as "ranching natural." Natural landscape characteristics have been extensively modified (for example pinyon-juniper eradication, reseedings, fenced pastures, and secondary access roads) to facilitate agricultural and ranching activities. These modifications are mixed with stands of pinyon-juniper, areas of big sage, and mountain brush at higher elevations. Although classified (Roy Mann Associates, Inc., 1977) as common (B) and minimal (C) scenic quality, the conversion of pinyon-juniper stands to areas of grasses, forbs, and low shrubs has created landscape character that adds variety to an otherwise monotonous viewshed. Figures 2, 4, 9, and 10 are typical scenes viewed within and adjacent to the lease area.

The lease area is within 2-3 miles (far middleground) and 3 miles and beyond (background) from different points on the south rim of the Paunsaugunt Plateau. Almost the entire lease area, including the mine plantsite, is visible from the proposed Mill Creek Point Overlook on the Dixie National Forest. Approximately 8 miles of the extreme eastern section of the proposed strip mining area is visible from Yovimpa Point in Bryce Canyon National Park. The proposed strip mining area that can be seen from this overlook appears as a thin, almost continuous strip at 4.8 miles (far middleground) and beyond (figs. 11, 12).

In 1976, fewer than 1,000 individuals viewed the lease area from the proposed Mill Creek Point Overlook, but more than 100,000 viewed the extreme eastern part of the lease area from Yovimpa Point.

The lease area, including existing modifications, as viewed from the south rim of the Paunsaugunt Plateau, appears almost totally as a natural landscape. Modifications for the most part, are irregular in shape, disguised or hidden by topographic features, or are muted by distances involved. Although classified as common (class B) scenic quality, the lease area, as seen from the south rim of the Paunsaugunt Plateau, makes up a part of the panoramic view. Maintenance of a natural-appearing landscape character from view points on the plateau is important to the viewing public.

7. Archeology and History

Archeological work in the region has identified the previous existence of Archaic groups, Virgin Anasazi, Fremont, Southern Paiute, and Navajo cultures in the area (Aikens, 1965; Steward, 1941; Euler, 1966; Davidson and others, 1974; and Nielson and Thompson, 1977). Many sites have been recorded near the lease.

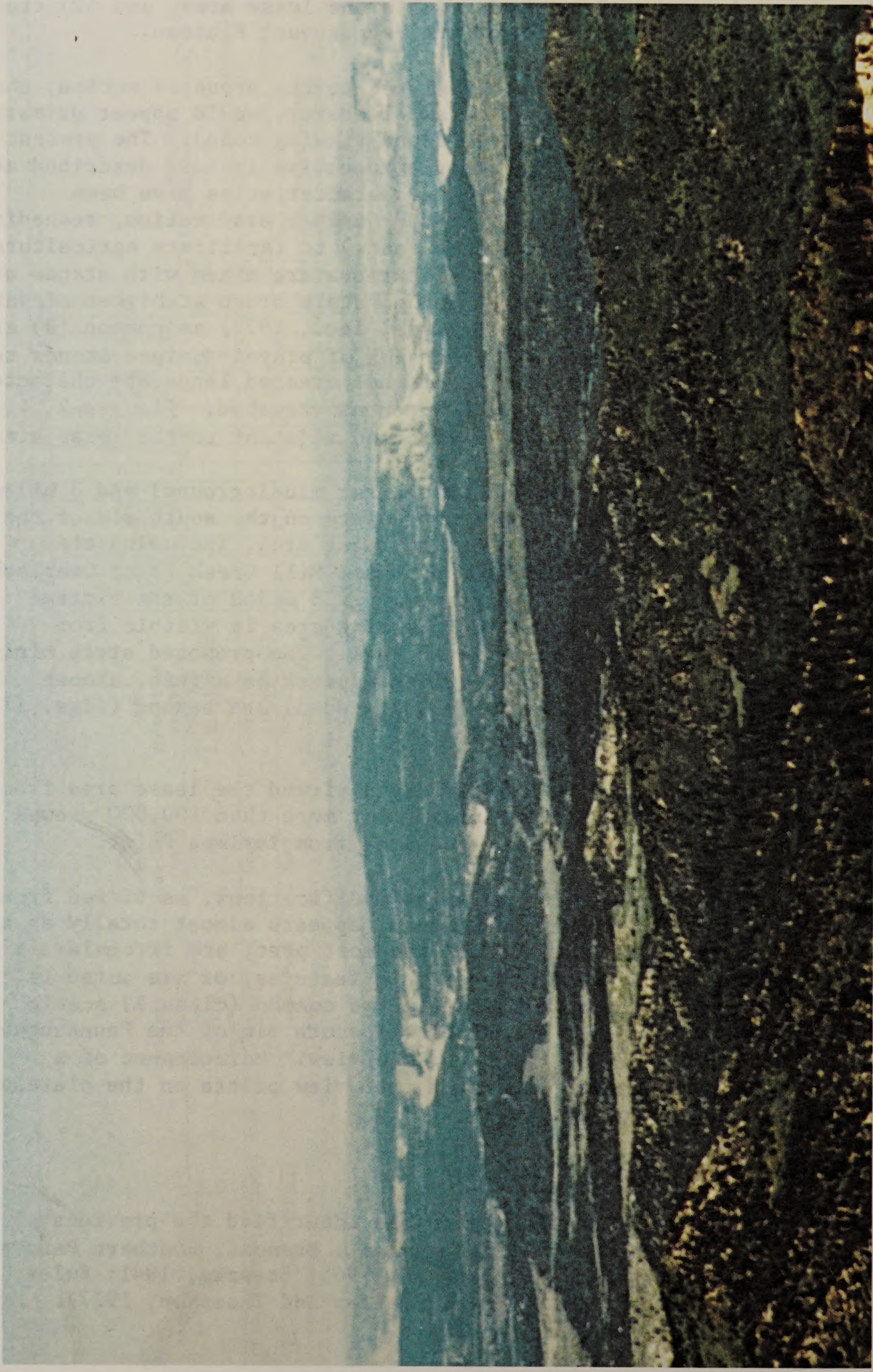


FIGURE 11.--Photograph of panel 5 east within the Alton lease area from Yovimpa Point, Bryce Canyon National Park, prior to the strip mining operation.

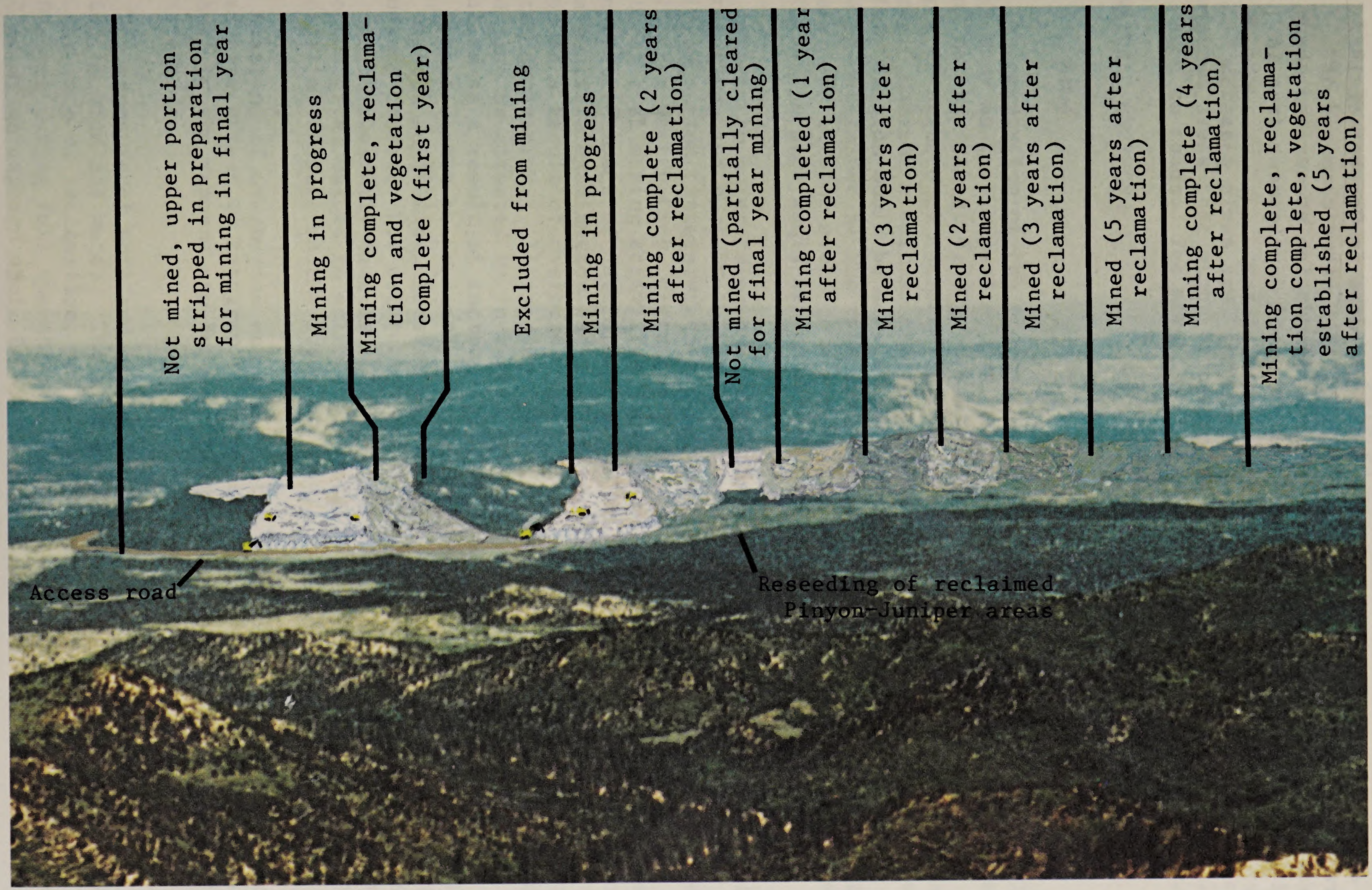

Not mined, upper portion stripped in preparation for mining in final year
Mining in progress
Mining complete, reclamation and vegetation complete (first year)
Excluded from mining
Mining in progress
Mining complete (2 years after reclamation)
Not mined (partially cleared for final year mining)
Mining completed (1 year after reclamation)
Mined (3 years after reclamation)
Mined (2 years after reclamation)
Mined (3 years after reclamation)
Mined (5 years after reclamation)
Mining complete (4 years after reclamation)
Mining complete, reclamation complete, vegetation established (5 years after reclamation)
Access road
Reseeding of reclaimed Pinyon-Juniper areas

FIGURE 12.--Photograph of panel 5 east within lease area from Yovimpa Point, showing simulated strip mine appearance in the 21st year of operation.

A reconnaissance survey of the lease was done in October of 1977 (Pierson, 1977). This survey located two lithic sites composed of concentrations of chipped stone. Historic foundation stones and abandoned buildings were located also. The proposed development area is clear of properties listed in the National Register.

CHAPTER III

ENVIRONMENTAL IMPACTS

All acreages given are "worst-case" figures. That is, they reflect the maximum areas that might be disturbed by mining and ancillary facilities, such as roads. The actual acreages disturbed would likely be fewer.

A. NATURAL ENVIRONMENT

1. Land

Implementation of the proposal would result in temporary spoil piles and as many as four separate pits, with accompanying 150-foot highwalls during mining. About 8,300 acres of land would be affected, with some changes in structural characteristics and slope. Slope stability may be altered. Current erosional and depositional processes would continue and possibly erosion would be accelerated. The magnitude of these changes would be determined by the type and success of reclamation. Sand and gravel, cinders, and clinker would be removed from undetermined sites for aggregate and fill. The pits would be reclaimed.

Impacts to paleontological resources would consist of losses of plant, invertebrate, and vertebrate fossil materials for scientific research, public education (interpretative programs), and other values. Losses would result from destruction, disturbance or removal of fossil materials as a result of coal mining activities, unauthorized collection, and vandalism. A beneficial impact of development would be the exposure of fossil materials for scientific examination and collection which otherwise may never occur except as a result of overburden clearance, exposure of rock strata, and mineral excavation. All exposed fossilferous formations within the region could also be affected by increased unauthorized fossil collecting and vandalism as a result of increased regional population. The extent of this impact cannot be presently assessed due to a general lack of specific data on such activities. Because of the present lack of data and accepted evaluatory criteria for determination of significance, no meaningful assessment can be presently made as to the extent and nature of the loss of these paleontological values to science or education, or hence to the significance of potential impacts on the fossil record.

Blasting of overburden and coal in the mine is not expected to create any adverse effect to topographic formations in Bryce Canyon National Park as shown by the company and Bureau of Mines analysis (UII, 1976, Fogelson, D. E., 1977).

The exposure of soil and overburden would increase susceptibility to erosion by wind and water. The area exposed at any one time would depend upon the rate of reclamation, and is estimated to range from about 500 to 1,500 acres during full operation. Increased erosion, above natural rates, would occur on exposed spoil between the period of disturbance and reclamation. Control of runoff carrying sediment, as required by mining regulations, would preclude impacts from sediment beyond the mining area. Soil erosion that takes place after topsoil has been added during the reclamation process could affect revegetation efforts. These effects can be mining by such actions as contour trenching, terracing, chisel plowing, and mulching. After land reshaping and vegetation, it is projected that the erosion rates over much of the area would be less than under the natural conditions.

Because topsoil would be conserved and redistributed on the surface, many of the undesirable characteristics of the spoil would be negated and soil conditions would be relatively near-natural. Some alteration of physical and chemical properties of soil by removal, some stockpiling, and redistribution would occur. These impacts are not projected to be significantly adverse because the final seed bed would not be appreciably different than seed bed prepared for agricultural crop production.

2. Water

The proposed action would require about 900 acre-feet of water per year, 160 acre-feet for mining activities and 740 acre-feet for domestic needs in communities. About half the water used domestically would be discharged as effluent from sewage treatment plants and could be reused for agriculture (part 1, chapter IV, Water). Domestic water needs would likely be supplied from water presently used for other purposes, mainly agriculture and the change is not expected to alter significantly the flow of any streams in the area. Present diversion points are fixed by established water rights and are not expected to change. Water for mining would come from groundwater seepage in the coal pits, or if needed, would be obtained from the well field tapping the Navajo sandstone (see part 1, chapters I and IV; impact would be local and the developed water supplies of Alton, Kanab, and Johnson Canyon would not be affected.

No reduction in flow owing to strip-mining activity is anticipated in the East Fork Virgin River, Kanab Creek, or the Paria River. The mining operation is designed and will be administered to avoid impedance of surface flow and to reduce sediment transport.

Twenty-two springs on or near the lease would be destroyed by mining (fig. 5). These springs have an average flow of 1 to 5 gal/min except for two, in secs. 30 and 32, T. 39 S., R. 5 W., which are reported to flow as much as 20 gal/min (Goode, 1964). The combined flow of the 22 springs probably averages 100 to 150 acre-feet per year. The water from springs would not be lost but would be discharged elsewhere in the same watershed. Ponds created by reclamation would provide watering places for wildlife and livestock. The water in these ponds may contain greater concentrations of dissolved solids than the spring water but should be suitable for wildlife and livestock.

Mining that drains water from saturated beds will alter ground-water flow and could lower water levels of the minesite. In areas where pits would be developed in saturated beds, necessary drainage would affect areas adjacent to the mines. Initially, mine drainage would be derived from ground-water storage in the mine area. As drainage continued, some water would be released from storage outside the pits. Where the floor of the pit is above the saturated beds, ground water might receive recharge from the pit and water levels would rise accordingly. It is estimated that available ground water in and above the mined beds would total 6,000 to 10,000 acre-feet.

Effects of drainage from ground-water bodies in the East Fork Sevier River drainage would probably be small or negligible because of the distance (2 to 4 miles at the nearest point) between the mining area and the divide, the relative positions of the coal beds and water table, and the presence of less-permeable strata. Backfilling pits would not restore aquifer properties, even though the fill became saturated. Backfill would be too poorly sorted for good well yields. Blasting is not expected to create ground-water problems outside the mine pits.

Removing and replacing the overburden would contaminate ground water from increased leaching of disturbed material; dissolved-solids concentrations may increase two or more times, and high concentration of nitrate in overburden material indicates that water in saturated overburden may become nitrate contaminated and unsuitable for human consumption. Sulfur content of the coal is generally less than 1 percent and acid formation would likely not occur. If acid is produced from sulfur in the refuse, bicarbonate concentrations in water would buffer pH to acceptable limits (pH of 6.0-7.5). It is anticipated that contaminated ground water will be restricted to the vicinity of the mine because little water movement is expected through the replaced overburden.

No increase in sediment load is expected in the East Fork Virgin River. If sediment control measures are not completely effective, local increases in sediment load may be expected in tributaries of Kanab and Skutumpah and other washes directly intercepted by strip-mining activity. However, increased sediment movement to the Colorado River would be insignificant (less than 0.2 of 1 percent) because the source area (the spoil piles) at any given time would be extremely small compared with the total contributing areas of Kanab Creek or the Paria River. The concentration of dissolved solids in runoff from the mined area may increase as much as 10 percent (Verma, 1977). This increase would have little effect locally and would probably be imperceptible in flows to the Colorado River because the mined area is less than 0.5 of 1 percent of the total watershed involved.

3. Air

A detailed analysis of potential air quality impacts at the proposed Alton mine indicated that dust from travel on unpaved roads would account for about 80 percent of the total suspended particulate (TSP) emissions, assuming 50 percent control from applying water to unpaved roads (AeroVironment, 1978). Total potential emissions from the Alton mine would be an estimated 18,630 tons per year (2,300 tons per year from mining activities and 16,330 tons per year from travel on unpaved roads). Sources with the potential to emit 250 or more tons of emissions per year are subject to PSD permit review (EPA). This review will include determination of Best Available Control Technology (BACT) and at a minimum, will require the best management practices that are listed in chapter I, Legally Enforceable Mitigating Measures, to control fugitive dust.

Because of the nature of strip mining operations, some haul roads would be in use for long periods of time and will be paved or chemically treated, while other roads would be in place for only short periods of time and fugitive dust may be controlled by watering. Thus, the percentage of fugitive dust control cannot be accurately estimated, but emission of fugitive dust would be substantially reduced from the 50 percent reduction originally assumed in the AeroVironment analysis.

The analysis combined impacts from the proposed mine, the proposed Warner Valley and existing Navajo powerplants, and the towns of Alton, Glendale, Orderville, Hatch, Henrieville, and Tropic. Powerplant impacts would be minimal because of their distance from the proposed Alton mine. The short-term (24-hour) impacts were analyzed for the situation in which the mining operations would be the closest to Bryce Canyon National Park. The 24 consecutive hours with the most consistent airflow toward Bryce Canyon (occurring only once in the February 1976-June 1977 record) was used as the worst-case assumption. The maximum particulate concentration increase of about 10 $\mu g/m^3$ (24-hour above-background) would be located near the strip mining activities, haul roads, and the town of Alton (fig. 13); added to the average 24-hour average background TSP level of 21 $\mu g/m^3$, the total anticipated 24-hour average concentration of about 31 $\mu g/m^3$ would be substantially below the standard of 150 $\mu g/m^3$ (NAAQS, see chapter II, Natural Environment, Air). Application of BACT measures would substantially reduce the calculated increase of 10 $\mu g/m^3$ computed under watering control alone.

At the class I Bryce Canyon National Park particulate concentration would increase about 1 $\mu g/m^3$ for the 24-hour average--well within the 10 $\mu g/m^3$ incremental increase allowed under PSD regulations (EPA). The maximum impact at Zion National Park would be less than at Bryce Canyon because pollutants would diffuse more in traveling the longer distance to Zion. In addition, the frequency of occurrence of impacts would be less at Zion than at Bryce Canyon because winds blow toward Zion from Alton less frequently.

Excluding fugitive dust from the analysis, total particulate emissions from the proposed Alton operation are reduced by a factor of about 10. The increase in the 24-hour average from non-fugitive dust would be less than 1 $\mu g/m^3$ at 0.6 miles (1 km) from the source. The impact at the closest class I area of Bryce Canyon is estimated to be about 0.1 $\mu g/m^3$, well within the PSD allowable 24-hour incremental limitation. Application of BACT would further reduce these estimated concentrations.

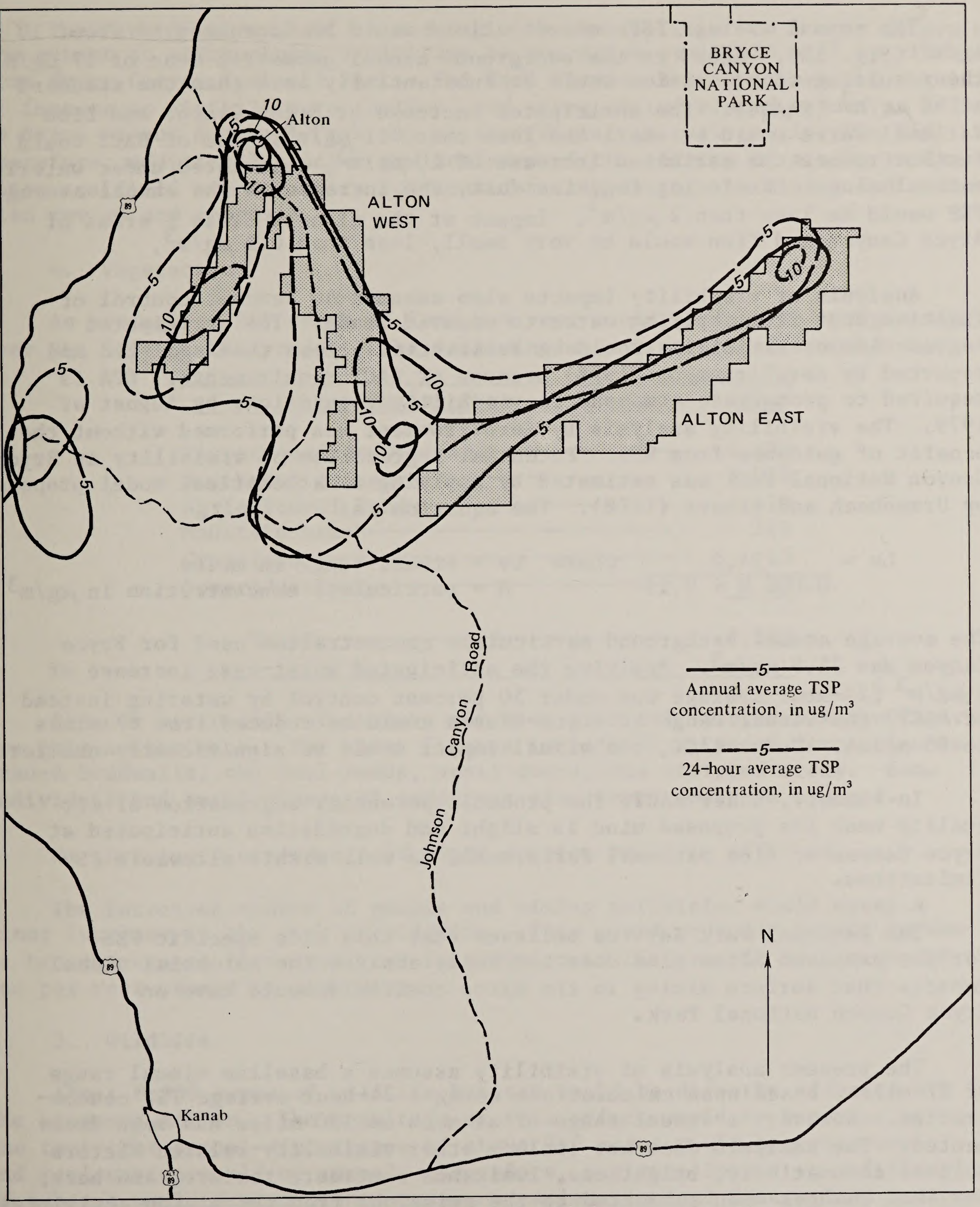


FIGURE 13.--Map showing predicted increase in 24-hour and annual average TSP concentrations, Alton mine area.

The annual average TSP concentrations would be increased by about 10 $\mu g/m^3$ (fig. 13). Added to the background annual geometric mean of 17 $\mu g/m^3$, the resulting concentration would be substantially less than the standard of 60 $\mu g/m^3$ (NAAQS). The anticipated increase at Bryce Canyon and Zion National Parks would be small and less than 0.1 $\mu g/m^3$. Use of BACT would further reduce the estimated increase of 10 $\mu g/m^3$, calculated under watering control alone. Excluding fugitive dust, the increase in the annual average TSP would be less than 2 $\mu g/m^3$. Impact at the closest Class I areas of Bryce Canyon and Zion would be very small, less than 0.1 $\mu g/m^3$.

Analysis of visibility impacts also assumed 50 percent control of fugitive dust from applying water to unpaved roads. The anticipated degradation of visibility would be substantially less than analyzed and reported by AeroVironment (1978) because of BACT requirements. EPA is required to promulgate atmospheric visibility regulations by August of 1979. The visibility analysis by AeroVironment was performed without the benefit of guidance from EPA. Potential degradation of visibility at Bryce Canyon National Park was estimated by applying a mathematical model proposed by Ursenbach and others (1978). The equation is:

$$Lv = \frac{24.2}{0.006\ M + 0.15}$$

where Lv = visual range in miles

M = particulate concentration in $\mu g/m^3$

The average annual background particulate concentration used for Bryce Canyon was 21.5 $\mu g/m^3$. Applying the anticipated worst-case increase of 1 $\mu g/m^3$ (24-hour average and under 50 percent control by watering instead of BACT) the visual range at Bryce Canyon could be reduced from 87 miles to 85 miles. Under BACT, the visual impact would be significantly smaller.

In summary, under BACT, the probable potential degradation of air quality near the proposed mine is slight and degradation anticipated at Bryce Canyon or Zion National Parks would be well within allowable PSD limitations.

The National Park Service believes that this site specific FES for the proposed Alton mine does not fully analyze the potential visual impacts that surface mining in the Alton coalfield would have on Bryce Canyon National Park.

The present analysis of visibility assumes a baseline visual range of 87 miles, based upon calculations using a 24-hour average TSP concentration. However, a visual range of as much as 180 miles has been documented. The analysis does not include other visibility-related factors such as chromaticity, brightness, luminance contrast, texture, and haze; how each changes when subjected to the emissions from the mining activities; and how this may relate to visual alteration of landform characteristics. Consideration of these additional factors is necessary for more complete analysis and should result in more accurate projections of potential impacts on visibility. However, atmospheric visibility regulations are not expected to be promulgated by EPA until August 1979. The visibility analysis made in this EIS was done without benefit of this guidance.

The Park Service staff is working with the applicant to better determine the extent to which mining activities in the Alton coalfield will be visible from Bryce Canyon National Park. The Park Service believes that the significance of impacts on visibility, esthetics, and air-quality related values as related to Bryce Canyon National Park may be insufficiently analyzed in this EIS; therefore, additional studies and analyses of the effects of mining in the Alton coalfield are necessary for consideration during the mining and reclamation plan review and approval.

4. Vegetation

An average of 360 acres of land per year would be lost to strip mining. Over the life of the project, the following approximate losses would accrue:

Vegetation type	Acres
Pinyon-juniper woodland	6,380
Sagebrush grass	1,070
Agricultural land	420
Mountain brush	315
Grassland	65
Nonproductive	50
Total	8,300

Because strippable areas have not been precisely mapped acreage figures are only approximate. The above figures include 35 miles of discontinuous graded headwalls, the haul roads, spoil dumps, and stripped areas. Some individual and small clumps of ponderosa pine trees would be removed.

No threatened or endangered plant species would be affected.

The increased number of people and mining activities would cause a minor increase in the risk of wildfire. This would probably result in one or two man-caused fires per year in addition to the present occurrence of one per year caused by lightning.

5. Wildlife

About 8,300 acres of wildlife habitat would be directly affected by the proposed action. The magnitude of this effect would be tempered by the fact that annual disturbance of about 360 acres would be temporary, and reclamation would be annual. Therefore, ultimate losses or modifications of habitat would depend upon success of reclamation and future land management.

All wildlife would experience some loss of habitat and local population reduction. For species with high population densities, high reproductive rates, mobility, and adaptability to a variety of habitats, the local population reduction would have a minor adverse effect upon regional welfare. The coyote, jackrabbit, mourning dove, and songbirds are examples of these species.

For species lacking some or all of the population characteristics mentioned, impacts would be more significant. The most significantly impacted would include mule deer, mountain lions, bobcats, sage grouse, turkey, and birds of prey.

Mule deer would be displaced from as much as 8,300 acres of summer range (3.1 percent of the total on this herd unit), and major browse areas would be significantly reduced if reclamation were not successful. Clearing large expanses of pinyon-juniper would reduce the quality of deer summer range. Deer use decreases with distance from cover, and large cleared areas are little used except next to forest borders (Reynolds, 1966). The absence of cover would limit deer use, even though forage quality may be improved by clearing (Short and others, 1977). This reduction in habitat quality and loss of deer use would continue until reclamation or natural succession restored sufficient cover to allow full utilization of the area that would be cleared. In addition, the disturbance caused by mining, coal-haulage, and increased human activity would significantly disrupt migratory patterns and use of surrounding areas. The effect of these impacts would be a reduction in the long-term productivity of the herd and a reduced potential for increasing the herd from its present low level. Data on the carrying capacity of summer range are not available; therefore, the amount of this reduction cannot be predicted. Disturbance caused by mining and reclamation would reduce deer use on winter range adjoining the proposed mine area. Approximately 8 miles of the summer-range winter-range boundary is contiguous with the southern border of the proposed mine, and deer use would be reduced 50 percent on the area within 0.1 mile of this disturbed area. Pinyon-juniper of 512 acres, with a carrying capacity of 0.1 deer per acre, would be affected. This reduction in use would reduce the deer population potential by 26 deer. This impact would continue until mining and active reclamation work in that area were completed. The direct loss of deer to vehicle strikes would be expected to increase because of increased traffic.

Mountain lions and bobcats use rocky areas as denning sites, and significant loss of this habitat would result in a direct population reduction. Daily blasting, increased human activity, and reduction or displacement of prey would also affect local distribution of these species. Based on home range size, topography and prey distribution (Seidensticker and others, 1973), the proposed mining would encroach upon the yearly home range of at least four mountain lion. Abandonment of these home range areas would reduce the local population by four animals. Because of lack of data, the number of bobcat that would be affected cannot be predicted.

Sage grouse and wild turkey depend on specific habitat which limits their distribution. Removal of this habitat, changing it, or displacement from it by disturbance would impact their populations directly and adversely. Loss of roost trees would displace turkey from otherwise suitable habitat (Scott and Boeker, 1977). The proposed action would eliminate or significantly alter about 2,000 acres of sage grouse range, 350 acres of summer turkey range, and 6,000 acres of turkey winter range, which would reduce the long-term productivity of these species. The reduction cannot be determined; however, the populations that would be affected are small. The uniqueness of this resource in Utah makes any reduction of turkey habitat significant.

Birds of prey are sensitive to disturbance during their nesting period, and mining activities would significantly lower local nesting success (Snyder and Snyder, 1975). Eliminating nesting sites in trees and rocky outcrops would eliminate production. A study in southeastern Montana and northern Wyoming revealed that ponderosa pine was used more extensively (66.8 percent) than all other available nesting habitats (Lockhart, 1977). Species most affected by removing mature ponderosa pine would include golden eagle, red-tailed hawk, goshawk, Coopers hawk, and American kestrel. Impact would be long term, as planned reclamation would not restore those sites. Local populations would be reduced an unknown amount.

An increased population would need 840 new single-family residences, which might occupy 210 acres of wildlife habitat. Wildlife presently occupying those areas would be displaced or eliminated. The type of wildlife affected and significance of impact cannot be predicted.

6. Fisheries

No fishery is on the proposed site but mining could impact fisheries offsite if streamflow is depleted or water quality is degraded. Any reduction of flow in the East Fork Virgin River will reduce the sport-fish habitat and may jeopardize the woundfin and Virgin River roundtail chub (written communication, Holden and Deacon, 1977; Willoughby, Regional Director, Fish and Wildlife Service, 1978).

Any increase in temperatures, sediment, dissolved solids, leached salts, or other contaminants would adversely affect fisheries downstream. Available data, however, do not permit predicting effects of these contaminants.

New population could add 1,150 fishermen, and small fisheries in the area could be overfished.

B. CULTURAL ENVIRONMENT AND LAND USE

1. Lands

Mining accords with the land use recommendations of BLM and Kane County. With appropriate mitigation and reclamation, no adverse impact is anticipated.

2. Agriculture, Range, and Timber

Each year an average of approximately 360 acres of vegetation with an average grazing capacity of 8 AUM's will be lost, plus the average of 78 acres for haul roads and spoil dumps. Assuming revegetation takes 5 years, the loss during that period will be 1,930 acres or 45 AUM's. Starting with the sixth year, the reclamation process should catch up with the stripping, making reclaimed land available for grazing. From this point on, the grazing capacity should hold at or above the sixth year figure until the end of the mining operation. Stripped areas, roads and fences would disrupt the normal grazing and watering patterns of the livestock.

The reclaimed land should have a grazing capacity 20 percent higher than before mining because of present low production (USBR and others, 1975). At the end of the stripping operation, the vegetated area should start increasing by 360 acres or 8 AUM's per year, until all of the area becomes usable.

A moderate number of juniper fenceposts would be salvaged each year during the clearing operations. These will not be replaced (regrown) until well after the end of mining. Likewise, a moderate volume of Pinyon nuts, firewood, and Pinyon Christmas trees would be lost each year and not replaced (regrown) until long after the end of mining.

3. Socioeconomics

The proposed action could add 3,650 to 3,750 to the 1990 regional population.

Impact of this additional population, even though it is greater than the 1974 total Kane County population, would not be relatively major. This conclusion is based on the following assumptions: (1) The local total population will expand in the next 12 years; (2) the majority of the employees and their families would be former residents and (or) share a similar lifestyle as the established residents; and (3) open pit coal miners do not require the experience and expertise of underground miners; therefore, more employees could be hired locally. Impacts would be greatest in urbanization and housing needs and demands in Alton. As now constituted, the community of Alton would cease to exist. If present trends continue, as much as 40 percent of the residents could live in trailer homes. The second greatest impact would be additional school needs. The third would be problems of costs, taxation, and bonding of local, county, and State residents to construct, operate, and maintain sewers, water systems, streets, and garbage and trash collection and to provide police and fire protection.

Higher incomes which would be received by the coal-mine work force and an increased tax base would expand the general regional economy (part 1, chapter IV).

4. Transportation and Utilities

Impacts of coal transport from the mine to the proposed Harry Allen-Warner Valley power plants are analyzed in the site specific statement being prepared by the Bureau of Land Management. Highways and roads would have heavier traffic, however, as a result of workforce and service trucks to the proposed mine. If average employment were 621 and employees were to commute an average distance of 22 miles each way, 3.8 million gallons million gallons of gasoline would be consumed over a 24-year period. During commuting hours, 122 cars and light trucks per hour would be passing over the mine access road (table 7). Indirect traffic increase resulting from the larger population in the area has not been estimated, but it would be substantial. Increased traffic over the present road system would decrease the life expectancy of affected roads and would increase required maintenance.

The proponent recognizes in the mine plan that the existing access roads to the Bald Knoll area would be inadequate when the mines were in full production. These roads, 5 miles from FAS 421 to the mine, 16 miles of FAS 421, and 7 miles of the Glendale cut off would have to be upgraded. The result would be an improved transportation system in the Alton area.

Electrical power would become available to this area for the first time. Coal mining and processing would use about 84 MW of power annually.

Ten to twelve miles of new telephone line would be built to the minesite from either Glendale or Alton, requiring 24 to 29 acres of new right-of-way, assuming an average width of 20 feet.

The company estimates that 50 miles of more or less temporary access roads would be constructed, most of which would be overrun as mining progresses. These roads would range from unimproved tracks 20 feet wide to carefully-constructed roads 100 feet wide, over which the draglines would be moved from site to site. Eventually, about 50 miles of coal-haul roads would also be built; these would be 45 feet wide to carry 120-ton end-dump trucks. The crushed stone surface would be stabilized with petroleum-derived compounds or other chemicals.

Over the mine life, the average haul distance to the preparation plant (BLM site specific) would be 8.25 miles. At 120 tons per truckload, nearly 300 truckloads per day would be needed to maintain an average production of 9.2 mty. The trucks would travel about 4,900 miles per day, bringing a load to the central hoppers about every three minutes over a 16-hour day. On the average, 17 of the 120-ton trucks would be needed at one time; the company estimates 25 would be needed at a maximum.

5. Recreation

Impacts to recreation resources within and immediately adjacent to the lease area would include: (a) displacement or temporary elimination of present recreation uses where mining activities are in progress; (b) increases in recreation visits to local, regional and national recreation attractions as a result of increased population and improved access; (c) an increase in onsite and offsite noise nuisances, dust and other air pollutants; (d) increased onsite use to observe mining activities; (e) increased littering and vandalism; and (f) a possible reduction from 5 to

TABLE 7.--Present and estimated road traffic in the Alton area

[Data source: Records, Utah Department of Transportation. Note: A considerable amount of truck traffic would haul supplies to the mines and miners, but this was not estimated. Traffic on mine haul roads is not estimated in this table]

	Present cars and light trucks	Present heavy trucks	Additional cars and light trucks	Additional heavy trucks	Total cars and light trucks	Total heavy trucks	Total traffic (vehicles/ day)
U.S. Hwy 89, Panguitch to Hatch	1,380	240	39	--	1,419	240	1,659
U.S. Hwy 89, Hatch to FAS-421	1,295	230	94	--	1,389	230	1,619
U.S. Hwy 89, Glendale to Orderville	1,520	270	193	--	1,713	270	1,983
U.S. Hwy 89, Orderville to Mt. Carmel	1,555	275	92	--	1,647	275	1,922
U.S. Hwy 89, Kanab to Johnson Canyon	870	150	59	--	929	150	1,079
FAS-421, U.S. Hwy 89 to Alton	180	10	94	--	274	10	284
FAS-421, Alton to mine access road	30	0	210	--	240	0	240
FAS-421, mine access road to U.S. Hwy 89	30	0	59	--	89	0	89
County road, Glendale to mine access road	[1]20(e)	[1]0(e)	323	--	343	0	343
Mine access road, FAS-421 to Bald Knoll	0	0	592	--	592	0	592

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[1] (e) = Estimated; no traffic count has been performed on this road.

10 percent in hunter success from increased hunting pressure, road kills and disruption of wildlife habitat.

New residents associated with the mine would generate an additional 33,600 recreation visits per year to nearby local, regional and national recreation attractions by 1985. These visit are in addition to a projected 7,088,450 resident and non-resident visits to the same areas by 1985 under no new coal development conditions (part 1, chapter II). The increase owing to the projected level of coal development is not significant. However, it would generate additional over-use of some areas and developed facilities which are presently over-used. (See part 1, chapter II, table II-33.) An increase in off-road vehicle use would be expected.

6. Esthetics

Expansion and improvement of the present road system within and adjacent to the coal lease would create a network of prominent cultural lines, as viewed from 0-3 miles (foreground-middleground visual zones) and to some extent as seen from a part of the extreme south rim of the Paunsaugunt Plateau. The establishment of the mine plantsite at Bald Knoll would introduce a significant industrial modification in the center of a ranching-natural setting.

During the life of the mine, 35 to 500 acres would appear as raw earth and would assume the aspect of an on-going construction project. Mining and associated activities would be viewed mostly from a distance of 2 to 8 miles from the south rim of the Paunsaugunt Plateau. This would partially negate the visual impacts associated with the same activities near the town of Alton or adjacent to travel routes within the lease area.

Modification or changes in line, form, color, and texture would occur progressively during stripping and concurrent reclamation. Existing stands of pinyon-juniper, big sage, and some lands which have been converted from pinyon-juniper to grasses, would be stripped of vegetation prior to mining; after coal removal, they would be reseeded to grasses, forbs and shrubs. Figure 11 shows the east (panel 5 east) portion of the Alton lease from Yovimpa Point, Bryce Canyon National Park prior to the strip mining operation. After stripping and reclamation, panels west of this area would appear as a thin, discontinuous line as seen from Yovimpa Point (similar to Alton amphitheatre shown on the extreme right of photo after fifth year of reclamation, figure 12). The overview of mining during the last 5 years in the east end of the lease areas would be a major intrusion into a near-natural setting, as viewed from Yovimpa Point in Bryce Canyon National Park. However, after mining and reclamtion the stip-mining area, as viewed from Yovimpa Point, would appear as an extension of existing cultural modifications in the present landscape character.

Blasting of overburden and coal could create a nuisance to visitors at Yovimpa Point in Bryce Canyon National Park and other observation points on the Paunsaugunt Plateau if not adequately mitigated. The nuisance would be in the form of dust, noise, and vibrations. Premature razing of rock pinnacles, spires, and other topographic features along the south rim of the Paunsaugunt Plateau could result from excessive air blast and vibrations if preventative measures as outlined in chapter I, Environmental Protection and Reclamation, and Legally Enforceable Mitigating Measures, are not undertaken. A "worst-case" analysis has been made relative to blasting and the possible impact on both visitors and features on the south rim of the Plateau (Fogelson, D. E., 1977). The analysis indicates that air blast and vibrations would be below 136 decibels and 2 inches per second particle velocity recorded at the closest distance (2.6 miles) between the blasting operations and the National Park boundary. In comparison, the nearest sensitive topographic features are a minimum of 3.6 miles and the majority of visitors (95-98 percent) would be at least 4.8 miles from the nearest proposed blast site. Blasting activities in the "worst-case" analysis would not take place until the 20th to 22d year of the project. Prior blasting activities would be further removed. No damage to sensitive topographic features is expected because or required mitigations and distance between the features and the blast sites. (Also see chapter II, Natural Environment, Air.)

7. Archeology and History

An unknown extent of archeological values probably would be adversely impacted. Prior to mining or surface disturbance the area will be intensively surveyed to aid in mitigating potential impact.

Increased population because of mining may result in increased vandalism of archeological and historical sites. Easier access to the area created by the project may increase vandalism accordingly. No National Register properties are located in or near the area to be developed (U.S. Department of the Interior, 1978).

CHAPTER IV

MITIGATING MEASURES

State and Federal laws, regulations, and administrative policies that require mitigation or reclamation of mine areas, and responsibility or requirements of the surface-management agencies and the USGS District Mining Supervisor are listed in chapter III of part 1. These measures, and those in sections C and D of chapter I shall be required and are part of the Alton mining and reclamation plans.

The following mitigating measures could be required or implemented by the land management agency acting on behalf of the Secretary of the Interior; others could be required or implemented by the appropriate local, State or Federal agency. The effect of implementing these mitigations has not been assessed in the analyses presented in chapters III-VII.

A. WILDLIFE

In large cleared areas, a revegetation ratio of 40 to 60 percent cover would provide optimum habitat for deer. Interference with known deer migration routes could be mitigated by retention of stringers of cover along travel lanes, and retention of riparian vegetation along streams. Noncontiguous patches of cover separated by 300 feet or less would also serve as travel lanes (Black and others, 1975).

The displacement of turkey and birds of prey may be partially mitigated by leaving some stands of mature ponderosa pine for roost trees and nesting sites. Making artificial ledges in the highwall would provide nest sites for cliff-nesting raptors. A survey of raptor nesting sites and avoidance of those sites during the nesting season would reduce impacts on raptor productivity.

B. RECREATION

Impacts to recreation resources can be mitigated to some extent by (a) providing improved access to adjacent areas with similar user attractions and characteristics, (b) sprinkling of haul and transportation roads, and (c) increased law enforcement patrols in proportion to increase in littering, vandalism, illegal taking of game and indiscriminate ORV use.

Impacts to recreation resulting from increased population can be mitigated by (a) providing additional developed facilities to accommodate increase in use; (b) limiting use, by permit or other means, to an acceptable carrying capacity which will protect the environment and provide acceptable user recreation experience levels; and (c) implementation and enforecement of existing State and Federal regulatory statutes to control illegal taking of game, indiscriminate ORV use, vandalism and littering, or other illegal activities.

C. ESTHETICS

Impacts from road construction can be mitigated to some extent by following natural contour lines and reclaimed lands where possible. Straight line construction which forms strong auxiliary lines should be avoided. Adoption of the partial retention objective within areas seen from 4 miles or closer will help mitigate any potential adverse visual impact.

CHAPTER V

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

A. TOPOGRAPHY

Although most of the 8,300 acres affected by mining would be returned to approximate original contour, differences in detail would remain, including drainage patterns and probably final sloped highwalls. These changes would alter and might decrease gully cutting, depending on effectiveness of mitigating measures.

B. MINERALS

The proposed action would leave about 12 million tons of subbituminous, low-sulfur coal unrecovered.

Unavoidable destruction, disturbance, and removal of paleontological resources, both exposed and unexposed, would occur. The significance of this impact cannot be meaningfully assessed due to the lack of data and evaluatory criteria.

C. SOILS

Strip mining would disturb soils on about 8,300 acres. This would result in an increase in onsite soil erosion rates which would be greatest shortly after disturbance but would decrease as landforms are reconstructed and vegetation is re-established. The increased sediment yield would be expected to range from 0.3 to 2.0 acre-feet per square mile per year on exposed soil. After about 5 years it should be near what it was under natural conditions.

Soil productivity would be lost on-sites occupied by permanent facilities, such as roads. This acreage is not known. The productivity on reclaimed lands would be at least 90 percent of what it was prior to disturbance. Some soil nutrients would be lost by unavoidable burying during mining and reclamation.

D. WATER

Increased local sediment movement and degraded water caused by leaching of disturbed material cannot be avoided. Degraded water suitable for wildlife and livestock would probably require treatment for human consumption.

About 160 acre-feet of water per year would be used at the mine and 740 acre-feet per year would be needed by the increased population. Twenty-two springs, with a combined flow of 100-150 acre-feet per year, would be destroyed, which would be detrimental to wildlife and agriculture. Impact would be minimal, however, because water would not be lost but would be discharged elsewhere in the same watershed (probably upgradient from the present discharge point).

Mining that drains water from saturated beds will alter ground-water flow and lower water levels. Excavation and mine drainage would dewater some of these saturated beds and deplete the flow of some springs.

E. AIR

The amount of particulate emissions would be increased in the vicinity of the mine but resulting TSP concentrations would be well within allowable NAAQS and PSD limitations. TSP concentrations at Bryce Canyon and Zion National Parks are anticipated to be within PSD Class I limitations. Visibility at Bryce Canyon would be reduced from an average of 85 to 87 miles, based on an estimated 1 $\mu g/m^3$ TSP 24-hour concentration at Bryce Canyon, assuming 50 percent TSP control with watering. Application of BACT would make the visibility impact significantly smaller.

F. VEGETATION

Vegetation would be removed and changed on not more than 8,300 acres, with 360 to 2,190 acres cleared at any one time during the life of the project.

G. WILDLIFE

Any loss of deer forage, displacement of deer, or disruption of migration routes would be unavoidable for the life of the mine. Loss of long-term productivity of wildlife species due to unmitigable alteration or elimination of habitat cannot be avoided. The loss of wildlife to vehicle strikes, and displacement of wildlife from 210 acres of urbanized habitat would be unavoidable.

H. FISHERIES

If increased sediment, dissolved solids, salts, or other contaminants from the Alton mine reaches the downstream East Fork Virgin River or the Virgin River, fish production could be adversely affected.

I. RANGE AND TIMBER

Annual forage lost would range from 8 to 50 AUM's in any given year. Normal grazing and watering patterns for cattle would be moderately disrupted. A moderate volume of juniper fenceposts would be salvaged but not replaced by the project. Also, a small number of pinyon nuts, firewood, and Christmas trees would be lost. One or two fires per year would be caused by the additional people and activities.

J. SOCIOECONOMICS

It is possible that adverse socioeconomic impacts on lifestyles and subcultural values would be major and would, typically, not be mitigated by monetary assistance. These impacts would include urbanization and the development of a more cosmopolitan community lifestyle. In other words, in contrast to statements made in chapter III, it is possible that a work force (and associated new population) may emphasize different lifestyles than local residents. Consequently, a series of changes could occur which would be viewed by existing local residents as major and adverse.

K. TRANSPORTATION AND UTILITIES

Unavoidable adverse impacts to transportation and utilities would include increased traffic, which would decrease the life expectancy of existing systems and increase maintenance of roads and danger to human life and property from collisions with deer and livestock.

L. RECREATION

Some increase in indiscriminate ORV use, vandalism, littering, and illegal taking of game would be expected, even with implementation of mitigating measures.

Some use above acceptable carrying capacities on roads, trails, in developed campgrounds and picnic sites, and of regional fisheries will take place regardless of mitigating measures employed. Some reduction of hunter success during the life of the project would be unavoidable.

M. ESTHETICS

The mine support facilities, even if designed and constructed to blend with the surrounding landscape character, would still impose a substantial intrusion of industry in a basically rural setting. The effect should be secondary because the support facilities will be viewed at 2 to 3 miles (far middleground) from the main travel route in the valley and at more than 5 miles (background) from the south rim of the Paunsaugunt Plateau.

The raw, disrupted character of active strip panels and associated activities would be unavoidable. Some degradation of the esthetic resource will occur onsite from increases in noise, dust and smell. The surface disruption of mining-related dust would create a noticeable intrusion in the middleground panorama from the south rim viewpoint visited by several thousand people per year. This overview of mining during the last 5 years in the east end of the lease area would be a noticeable intrusion into a near-natural setting, as viewed from Yovimpa Point in Bryce Canyon National Park. However, after mining and reclamation, the strip-mining area as viewed from Yovimpa Point would appear as an extension of existing cultural modifications in the present landscape character.

N. ARCHEOLOGY AND HISTORY

Increased population in the area may result in vandalism to archeological and historical sites within the region. The direct impacts on cultural resources cannot be determined until an intensive survey is completed.

CHAPTER VI

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

Coal mining over the short-term life of the mine may lead to permanent increases in population, an improved transportation network and an increase in tourism in the region. Some long-term land-use changes would be inevitable, owing to the population and reclamation of the mine vicinity itself.

More specifically, an unknown number of exposed and unexposed fossil localities may be impacted but a gain in knowledge of paleontological resources may result because of surveys and exposure of resources which might never have been found without excavation. After reclamation many slopes would be more gentle, which could result in more useable landforms, reduced erosion, and less severe microclimate. Short-term soil productivity would be lost from the time of premining clearing until reclamation, or for 2 to 5 years. Soil covered by permanent facilities and transportation systems would be out of production for the life of the project. Inherent soil productivity would be reduced in general, but through reclamation the area would be as productive, or more so, than before mining.

Coal mining would effect long-term changes in the flow patterns of ground-water bodies above the bottom of the mine pits. Some of these saturated beds surrounding the refilled pits would, in time, refill; others would not. The discharge of springs whose flow has been depleted by drainage of perched ground water (long-term effect) would probably increase when mining ceases. Some springs would never recover because the water formerly supplying them would seek new outlets when the beds refill from natural recharge. Springs destroyed by road cuts, and perched ground-water bodies drained by cuts would not be reestablished.

Degradation of water quality from increased leaching from disturbed overburden would be long term. Increased salt content of the water may not affect wildlife or livestock but would be detrimental to productivity of irrigated soils.

Vegetation and associated range forage and forest products would be temporarily lost but after reclamation stripped sites would be 20 percent more productive than they are now. Range and wildlife productivity would tend to increase at the expense of forest products. Forest products probably will eventually be replaced through natural succession. The short-term use of about 8,300 acres of wildlife habitat would result in long-term alteration of habitat and effectiveness of reclamation would determine long-term effects on wildlife. Habitat may be adversely affected for some species and enhanced for others. Eliminating denning areas for mountain lion and bobcat and nesting areas for birds of prey would lower the long-term productivity of those species. Long-term productivity and potential for increased population numbers of sage grouse and wild turkey would also be lowered. Long-term productivity of wildlife would be eliminated on habitat converted to urbanization.

Developing this mine would cause some urbanization and a substantial growth in income in the subregion during the mine's life. The regional tax base would increase rural economic programs and agricultural employment would decrease. Without adequate planning and concurrent development of other sources of income, the region could become economically depressed when the mine closes. People depending on the mine for income then would move, mobile homes would be sold or relocated, some schools would close, and services depending on sales and property taxes would suffer. Possibly, the mortgage market would also suffer financially. However, access roads and public utility systems would probably remain, enhancing the opportunity for increased tourism.

Short-term use of the lease area for mining would temporarily displace some existing local recreation uses and activities. Mining, however, would generate interest and the opportunity for recreationists to view mining operations. After mining and reclamation, the lease area would again be available for present or improved recreation uses and activities. Use of the area for recreation would increase because of improved access and increased use of national and regional recreation attractions.

Strip mining and associated activities would significantly and temporarily impact the esthetic resource. The impact would be changes owing to mine support facilities, to active or recently completed (2 to 3 previous years) strip mining, to new road construction, and to traffic increases. After stripping and reclamation, the landscape would be extensively modified to appear as an extension of existing modifications that were made in the past to facilitate farm and ranch operations. Some long-term change would be expressed in line, form, color, and texture, but the change would not necessarily degrade the present esthetic quality.

Any archeologic or historic sites that are disturbed would result in a long-term impact to the in place value of that site. Collection of sites that might be found will insure recording of information that could otherwise be lost to natural forces or vandalism.

CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

An undetermined number of uninventoried exposed and unexposed fossil localities would be lost or disturbed. Natural soil characteristics and properties would be irreversibly disturbed on 8,300 acres. Eroded soil and nutrients lost by burying some topsoil would be irreversible and irretrievable. Loss of vegetation and associated range forage and forest products over the life of the project would be irretrievable. Proper reclamation of disturbed areas, however, would reverse the process. An unknown acreage would be permanently taken out of production where occupied by transportation systems left after mining. Fertilizer, mulch, and other reclamation materials will be consumed to attain soil productivity similar to that before mining.

Disruption of ground-water flow and 22 springs at the minesite would be irreversible. Formations and possible saturated beds disrupted would include the Dakota Sandstone, Tropic Shale, and alluvium. Water used for mining (160 acre-ft/yr) would be consumptively used; water used domestically (740 acre-ft/yr) would be irretrievable, unless recycled or discharged as treated effluent.

Loss of denning and nesting habitat due to stripping and recontouring would be irreversible. Any loss of habitat types due to unmitigated alteration of the environment would be irreversible. The loss of habitat because of urbanization would be irreversible.

The 621 persons working at the mine would wear out about 930 light trucks and cars and use about 3.8 million gallons of gasoline in commuting to and from their work over the 24-year life of the project. An estimate of total diesel fuel use during the life of the mine has not been made, but coal haulage alone would require an estimated 30 million gallons. The long-term growth and improvement in the transportation system would result in some long-term deterioration of air quality because of increased traffic and fuel consumption, etc.

Increases in use of recreation resources, both within the lease area and regionally, would be irreversible. The remote, unoccupied appeal of some areas, that are presently inaccessible or lightly used, would be irretrievable because of the increase in use. The natural quality of the area would be lost during the life of the project. Industrial intrusions would exist and more urbanization would occur. After reclamation the lease area would reflect more of a rural ranching aspect than the present ranching-natural condition. The modification of the natural-ranching aspect to one of rural-ranching would be irreversible and irretrievable. Cultural resources in the immediate project area could not be preserved in place and their inplace value would be irretrievably lost.

CHAPTER VIII

ALTERNATIVES TO THE PROPOSAL

Approval of the applicant's mining and reclamation plan, as submitted, has been analyzed as the proposed Federal action in this statement. Alternatives to that course of action are discussed below.

A. NO ACTION

Pursuant to implied covenants of both the Federal mineral leasing laws and the existing lease agreements, the Secretary of the Interior must respond to a legitimate application to conduct operations on a valid Federal lease, provided all terms and conditions of the lease have been met. The Secretary's response may be approval as proposed, rejection on various legitimate grounds, or to defer decision based on proper grounds. "No action" on the applicant's proposed mining and reclamation plan would mean maintaining the status quo on the leasehold. The impacts of taking no action would be the same as described subsequently under the alternative "Reject the mining and reclamation plan."

B. DEFER FEDERAL ACTION

In the event of noncompliance of the applicant's proposed mining and reclamation plan to provisions of the Surface Mining Control and Reclamation Act of 1977 (30 USC 1201), the Secretary must defer action on the proposed plan. For other proper causes, he may also defer the decision. Such causes could include, but are not limited to, the time required and the need for the following:

- Modification of the proposal to correct deficiencies unrelated to SMCRA or to reduce or avoid environmental impact.

- Acquisition of additional data to provide an improved basis for technical or environmental evaluation.

- Further evaluation of the proposal and (or) alternatives.

- Development of an adequate system to monitor impacts for management and regulation.

The principal effect of deferring action would be a short-term delay in the imposition of all related impacts, both adverse and beneficial, of the applicant's proposal discussed in this statement.

The mining and reclamation plan included in this statement was prepared prior to the promulgation of the initial regulations (30 CFR 700) required under section 502 of the Surface Mining Control and Reclamation Act of 1977 (P.L. 95-87).

The Office of Surface Mining (OSM), which was created by that act, has not reviewed the plan for compliance. Therefore, the mining and reclamation plan may not reflect the requirements of the initial regulations. However, the applicable initial regulations are considered as a required Federal mitigating measure as described under "Legally enforceable mitigating measures" in chapter I of this statement.

The mining and reclamation plan should be returned to the operator, with a request that it be revised in accordance with the applicable initial regulations. As soon as the mining and reclamation plan is revised and returned to the regulatory authority, it will be evaluated to determine compliance with the requirements of 30 CFR 700.

Action could also be deferred until the plan is modified to include one or more of the alternatives discussed below under "Require modification of the mining plan." These alternatives if implemented would reduce or avoid some environmental impacts of the proposed action.

C. PREVENT DEVELOPMENT OF THE LEASE

1. Reject the Mining and Reclamation Plan

The Secretary may reject a proposed plan that does not meet the prescriptions of applicable law and regulations under his authority, including the potential for environmental impact that could be reduced or avoided by adoption of a significantly different course of action by the applicant. Except when a mine plan does not comply with existing regulations, the Secretary cannot under present circumstances reject the proposed plans to the extent that a de facto cancellation of a lease results unless he seeks and obtains additional authority from the Congress. Viability of this option is dependent upon timely legislative action; the option of rejecting the proposed plans pending legislation remains available.

If the Secretary were to reject the mining and reclamation plan, the lease would not be mined, and impacts previously discussed would be deferred until an acceptable plan was approved. The lease would continue in its present condition, subject to modification by natural processes and by the continuation of other existing activity and uses--and to further modification by the surface owner to meet other uses. However, the development of alternative sources of energy, such as other coal mines in the county, or a reduction of national energy consumption, could result. The applicant could correct the deficiencies in the plan and resubmit a modified mining and reclamation plan for approval. The result would be similar to that described in the alternative "Defer Federal action."

2. Seek Legislation to Cancel the Lease

The Secretary has very limited authority with respect to cancellation of an existing Federal coal lease. One such authority is prescribed in the lease terms entitled "Proceedings in case of Default."

A second authority was mandated by provisions of section 6 of the Federal Coal Leasing Amendments Act of 1975 (P.L. 94-377) which was subsequently written into regulations as 43 CFR 3520.2. The authority relates to failure of the lessee to meet the requirements for diligent development of the lease as defined by the Act.

The authority to cancel on other grounds would require congressional authorization for such action as well as for the requisite funds for compensation to the lessees. The Administration has not requested such legislation, and the Congress has not initiated such legislation related to the matters considered in this statement. The possibility of such actions is a matter for further consideration by the Administration and the Congress in the light of this environmental statement and other relevant nonenvironmental concerns.

To the extent that future coal production from this lease was curtailed or halted, alternative sources of energy would be required to meet anticipated needs and demands. The time required to replace the coal production potential could range from a few to several years. If this lease were cancelled through congressional authorization, all physical, biologic, and socioeconomic impacts stemming from the proposed mine would be avoided. Conversely, if development eventually were authorized, environmental impacts as discussed previously in this statement would occur, although impacts would be deferred in time and perhaps reduced because of changes in technology or requirements imposed at that time.

3. Exchange the Existing Lease

If the Secretary determines it to be in the public interest, he may initiate a proposal to the lessee for exchange of the existing Federal lease involved in this proposal for lease of other tracts of Federal coal or tracts of Federal sodium, phosphate, potash, or sulfur of comparable value, or for a grant of various future rights.

The Department of the Interior considers that the public interest would be so served if the Secretary finds that the benefits of production from the lease would not outweigh the adverse effects, or threat of damage or destruction to agricultural production potential, or scenic, biological, geologic, historic or other public interest values from lease operations. In exercising his discretion to exchange mineral leasing values in the public interest, the Secretary shall consider, but is not limited to, consideration of these elements of the public interest: recreational use; archeological or historic values; threatened or endangered species; proximity of residential or urban areas; study for potential inclusion in the wilderness or wild and scenic rivers systems; and value for public highways, airports, and rights-of-way.

Should the Secretary initiate such a proposal, the lessee is under no obligation to enter into such negotiations and may refuse to consider it.

If such a proposal is made and is rejected by the lessee, or if negotiations are entered and not agreeably concluded by the parties, and if the operations described in this statement are not otherwise prevented, such operations would eventually proceed and result in the impacts identified therein.

If an exchange proposal is made, accepted, and agreeably concluded for coal that is contiguous or very near to the existing lease, the proposed plan would have to be revised, resubmitted, and assessed. If the new plan encompasses the same methodology to be used in coal development, many of the impacts described herein would likely be very similar to those resulting from the new proposal, with a relatively short-term delay (several years) in their initiation. If a wholly different methodology is proposed for development of the replacement lease (e.g., underground versus surface mining), it could be substantially different from those described in this statement, and cannot be forecast at this time.

Presumably the unacceptable impacts or effects prompting the exchange would be avoided or substantially reduced in development of the replacement lease and found to be in the public interest. The existing lease would be relinquished, would not be mined, and would continue in its present condition as discussed below.

If an agreeable exchange were made for coal located elsewhere, or for a different mineral commodity located elsewhere, the relinquished lease would continue in its present condition, subject to modification by natural processes, by the continuation of other existing uses and activity, and to further modification by the surface owner to meet other uses. Potentially, the coal reserves relinquished would be withdrawn from development and this source of energy foregone. Direct financial benefits to the public may change in an exchange of leases.

The impact of exploration and development of the replacement lease under these circumstances will be translocated in space and time. They will relate to time and location, physical environment at the new site, mineral commodity involved, development technology proposed and approved, and other factors, none of which can be quantified or evaluated until or evaluated until the replacement lease is identified. The environmental impact of potential development of the replacement lease rights to be granted would be evaluated and considered in the exchange process, and while they may be greater or less than those described in this statement, they must be ultimately judged by the Secretary to be more environmentally acceptable than development of the relinquished lease, and to be in the public interest. Costs to the Department in identifying and evaluating one or more replacement tracts to be offered in the exchange could be substantial, and very likely be significantly more than the lessee's costs in establishing the fair market value of the tract to be relinquished.

4. Suspend Operations

The full development of existing leases could be delayed by suspension of operations. If such action were taken, there would be no additional incremental environmental impact on the area, and it would continue in its present condition, subject to further modification by natural processes, the continuation of existing mining activity, and such future uses of the surface as the owners may decide.

The authority of the Secretary of the Interior to suspend operations on existing leases has already been utilized on other Federal leases. Suspension of operations of this existing lease, for reasonable periods, with proper grounds, could be imposed. The Secretary cannot, under present circumstances, suspend operations to the extent that a de facto cancellation of a lease results unless he seeks and obtains additional authority from Congress. Viability of this option is dependent upon timely legislative action; the option of suspending operations pending legislation remains available. Impacts of this alternative would be similar to those described under "Cancel the lease."

5. Federal Reacquisition of Leased Rights

The outstanding leasehold interests could be acquired by the Secretary. The ability to acquire the leasehold interests is not granted by the existing relevant statutes and would require Congressional authorization for such action as well as for the requisite funds for compensation of the lessees. To date, the Administration has not requested such action, and the Congress has not initiated or considered such legislation; the possibility thereof is thus conjectural at best. The major effects of such Congressional authorization would be similar to those of cancellation of the leases as previously discussed.

D. RESTRICT DEVELOPMENT OF THE LEASE

The subject leases convey the right to develop, produce, and market the Federal coal resource thereon if all other terms and conditions have been met by the lessee. In general, the Secretary does not possess the authority to arbitrarily restrict development either as to location or rate. Various measures that may tend to restrict development may be taken by the Secretary at any time in the interest of conservation of the resources or in the protection of various specific environmental values in accordance with existing laws and regulations; for example, the National Historic Preservation Act of 1966, the Endangered Species Act of 1973, etc.

Thus, under present conditions, a general effort to restrict or regulate development of the existing lease for reasons other than failure to comply with existing laws and regulations would constitute a selective application of the "prevent development" alternative already discussed; that decision, as it related to impacts, possible litigation, and the need for authorizing legislation, would be relevant in this instance.

In addition, application of this alternative might not permit maximum recovery of the coal resources and would thus be contrary to principles of conservation embodied in the legislation which authorizes the leasing of these lands for the purposes described. It is entirely possible that such selective mining would leave isolated blocks of coal that might never be recovered owing to the high costs of mining such remnant areas at a later date.

E. REQUIRE MODIFICATION OF THE MINING PLAN

1. Coal Haulage Alternative

An alternative to the proposed truck haulage is a conveyor system from the pits to the preparation plant. This system would be of primary value in alleviating dust and noise problems and curbing emissions. A conveyor system probably would reduce the number of truck drivers and workers. The overall acreage needed for haulage would be reduced through the elimination of some of the truck haul roads.

This system would still require trucking coal from the face to conveyor loading points near the pits, and some acreage would still be needed for the conveyor system and its service roads. In addition, crushers would have to be established to break the coal to a manageable size before putting it on the conveyor. This would increase noise and dust levels in these areas. Conveyors would be less flexible than trucks, more expensive and require relocation as mining progressed.

The use of conveyors to transport coal would not significantly reduce impacts on wildlife. The amount of wildlife habitat that would be disturbed would be reduced slightly.

2. Auger Mining Alternative

Auger mining has been considered as an alternative to strip mining of the property. Mining would be confined to a 200-250 foot wide strip along the 35 mile outcrop.

This alternative is not considered viable because of the low (about 30 percent) rate of coal recovery.

3. Underground Mining Alternative

Underground mining of the coal in the property is an alternative, but physical conditions are not favorable for this type of extraction. Roof support and coal recovery for an underground operation would be adverse because of the varying thickness of the coal, numerous minor faults, and relatively thin and unconsolidated overlying strata. In addition, both the coal itself and adjacent formations are aquifers that present significant dewatering problems for mining. The coal recovery rate probably would not exceed 50 percent in comparison with 94 percent anticipated in the proposed action.

Because of the relatively shallow and unconsolidated overburden, less than 100 feet thick over a significant portion of the coal, the potential for severe subsidence over the mined area would be high. This would result in surface depressions, disruption of drainage patterns, and unstable slopes. If longwall mining could be employed, the irregular pattern of subsidence would be lessened.

The unfavorable geological conditions for underground mining would make extraction by this method extremely expensive if not impractical. Environmentally, the potential effect of underground mining, especially on drainage patterns and surface flows, probably would be more adverse than the impacts of strip mining. For these reasons, underground mining as proposed by the proponent is not considered a viable alternative for strip mining under the original proposal.

4. Alton East Strip Mining Alternative

An alternative mining plan has been proposed by Utah International Inc. for a portion of the UII Federal and State leases in the Alton East mine area. The company proposes to strip mine 16 million tons of coal over a period of 16 years from its holdings in T. 40 S., R. 4, 4 1/2, and 5 W. (fig. 14). The area affected would be 931 acres. About 320 acres overlying the Federal leases are in private hands.

The area would be mined by truck and shovel methods with stripping limited to 60 feet or less of overburden. Overburden would be blasted, shovelled into trucks and moved across the top of the coal to be dumped in mined-out parts of the pit. Spoil from the initial cuts would occupy about 5 acres in addition to the 832 acres to be mined over the life of the operation. Another 94 acres would be affected by buildings, a main haul road and various rights-of-way for utilities. Reclamation plans would be similar to those described in chapter I.

Coal would be loaded and moved by the same equipment used for overburden removal on alternate shifts. The coal would be trucked to a 46-acre industrial plantsite (fig. 10), where it would be crushed, stacked, loaded into trucks and hauled out via the upgraded Thompson Wash and Johnson Canyon (FAS-421) roads to U.S. Highway 89 (fig. 1). The main haul road would occupy 16 acres and various rights-of-way for utilities, 32 acres.

The mine would employ about 40 people during the construction phase and 113 people during full production. The shovel would be electric-powered with all other machinery being diesel or gasoline-fueled. UII estimates that water usage would be 26.5 acre-feet annually from ground-water sources discussed in chapters II and III. Electricity would be carried by a 69 V line to a portable substation, stepped down, and carried via ground cable to the shovel.

Soil impacts would be similar to those discussed in chapters III-VII but of less magnitude. Soils are dominantly of group 2 as described in chapter II. They are formed primarily from shale and are moderately deep. Surface layers are clay loam to silty clay and subsoils are silty clay. Reaction is about pH 8.0 throughout the soil profile. Part of the area has steep, rocky slopes in sandstone and along Thompson Wash

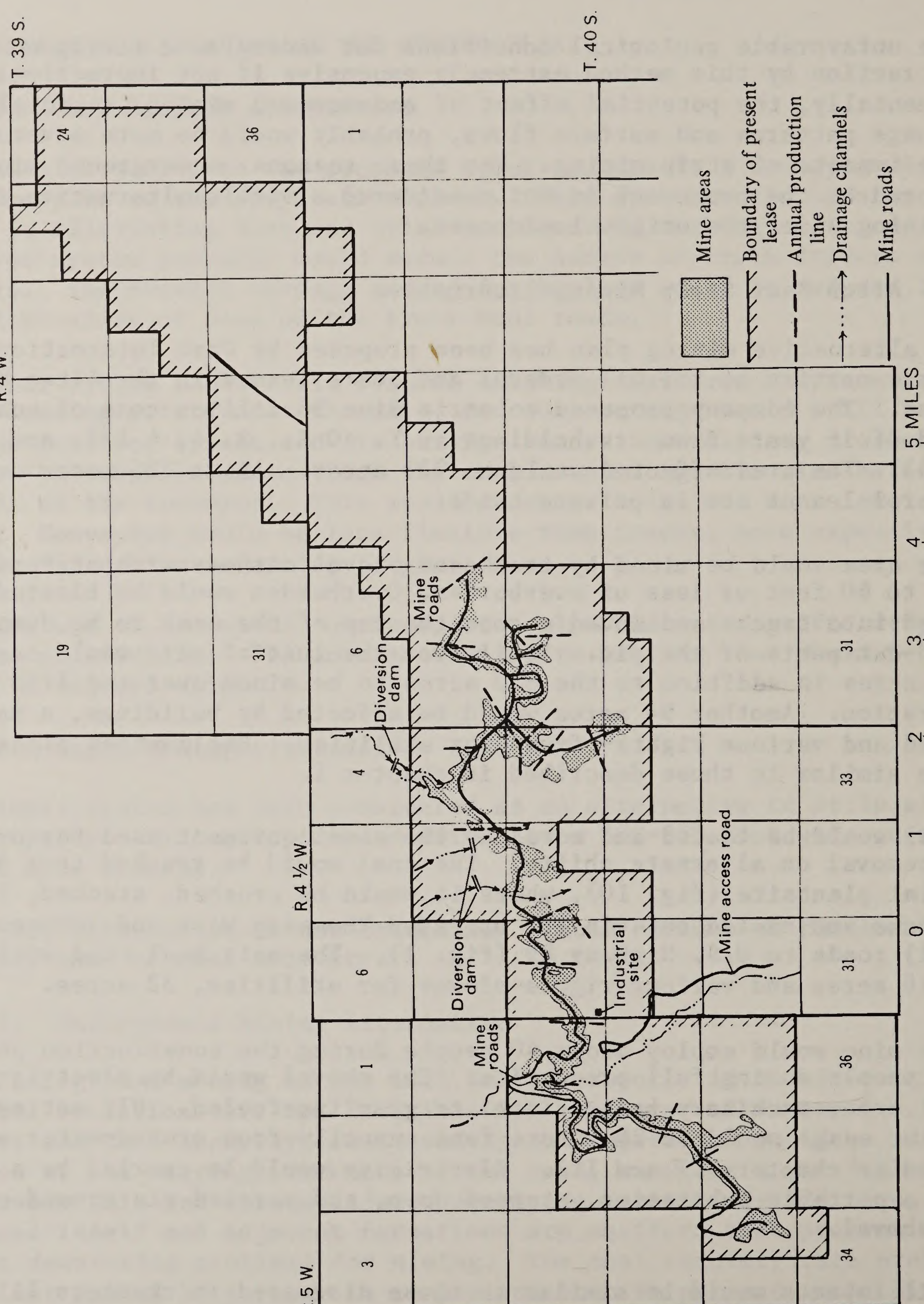

FIGURE 14.--Map showing Alton East strip-mining alternative, Kane County, Utah.

there are some fine-textured alluvial soils. About 837 acres of soil would be disturbed by strip mining and a total of 931 acres would be disturbed for the entire project.

The proposed alternative would require the use of about 200 acre-feet of water per year--about 50 acre-feet for mining activities and 150 acre-feet for the domestic needs of the increased population. About half of the water used for domestic purposes would be discharged as sewage effluent. About 125 acre-feet of water per year would be consumed by the proposed action. Water used for mining would be consumptively used; water for domestic use in excess of sewage return would be irretrievably utilized.

The alternative would cause effects similar to but smaller than described in chapter III. Mining would irreversibly interrupt some ground water flow but the extent of impact would be proportionately less than described in chapters III-VII. In areas where mining would disturb saturated beds, ground-water removal would be necessary and the drainage would affect areas adjacent to the mine pit. Drainage effects would not be as widespread as for the primary plan because of the smaller areas involved. It is estimated that about 600 to 1,000 acre-feet of ground water would be affected.

It is believed that the effects of drainage from ground water in the East Fork Sevier River drainage would be negligible or nonexistent because of the distance (2 to 4 miles at the nearest point) between the proposed mining area and the divide, and the relative positions of the coal beds and water table, and the presence of less permeable strata.

The impact on vegetation would be similar to the primary proposal but on a smaller scale. The Alton East alternative would affect about 10 percent of the area impacted by the primary proposal. Vegetation would be temporarily lost during the project, but proper reclamation of the disturbed areas would reverse the loss.

Wildlife resources in the area of this alternative are described in chapter II. Sage grouse habitat in the Skutumpah area is south of the proposed mine area. The entire length of the proposed mine access road is in deer winter range, and primary deer migration routes along Skutumpah Creek and Meadow Canyon cross the proposed mining area.

Impacts to wildlife would be similar to those described in chapter III; however, they would be reduced in area and amount. A total of 931 acres of deer summer range would be disturbed or altered. Mule deer would be displaced from about 1,000 acres of summmer range. In addition, the disturbance caused by mining, coal haulage, commuting miners, and increased human activity in the area would disrupt present migration patterns and use of surrounding areas. The effect of these impacts would be a reduction in the potential long-term productivity of the deer herd. The amount of this reduction cannot be quantified.

Increased highway traffic on the mine access road would increase deer highway mortality during winter months; however, the amount of loss cannot be predicted. Deer use within 1/10 mile of the road would be reduced by 50 percent on approximately 2,944 acres of winter range. A reduction in use on this amount of predominantly Pinyon-Juniper type with a carrying capacity of 0.1 deer per acre, would decrease the deer population potential by 147 deer annually. This impact would continue for the life of the mine.

Offsite impacts resulting from the influx of about 815 people into the surrounding area would be: increased disturbance of wildlife, destruction of habitat, increased illegal hunting, and added hunting and fishing pressure on game species. Over fishing in the Virgin, Sevier, and Kanab headwaters could occur as a result of new populations. The new population would require new homes that would occupy about 40 to 70 acres, possibly of wildlife habitat. Wildlife presently occupying this habitat would be displaced or eliminated.

About 40-70 acres would be converted to housing based on probable residental patterns (Executive Summary, Real Estate Research Corp. of America, 1976). The impact on agriculture and range would tend to be similar to the primary proposal but on a much smaller scale. Based on a surface disturbance of 931 acres, the Alton East alternative would result in a loss of only 8 AUM's.

About 130-135 employees would be necessary to mine 1 mty resulting in a population increase of about 800-825. About 150-175 new homes would be needed and their construction and changes in land use may cause significant local impact, if planning is not adequate. Basic regional sociocultural values would not be significantly impacted. Local residents, who might otherwise be unemployed, underemployed, and subsisting on low incomes could benefit.

The movement of 1 million tons of coal per year by legal-highway trucks would require moving 154 25-ton truckloads per work day. Assuming an 18-hour working day and that the unloaded trucks would return to the mine via the same route, a traffic increase of 17 trucks per hour could be expected on roads and highways chosen as haul routes. As markets are not yet known, it is uncertain whether the coal trucks would go south or north on U.S. Highway 89 (fig. 1). In either case, the existing roads to U.S. Highway 89 would require upgrading and some older sections of U.S. Highway 89 would require reconstruction. Specific areas where reconstruction would be necessary cannot be identified because the haul routes are unknown. Impacts to electrical and telephone systems would be the same as described in chapters III-VII.

The alternative would displace existing recreation uses onsite. Recreation and esthetic impacts would be primarily onsite, short-term, and would not create different uses if adequate reclamation measures are taken during the life of the project.

5. Alton West Strip Mining Alternative

This alternative mining plan has been proposed by the applicants for a portion of the leases held by NEI and UII in the Alton West mine area. The operation would be centered about 3 1/4 miles south of Alton in T. 39 S., R. 5, 6 W. and T. 40 S., R. 5 W. (figs. 1, 15). It would produce 1 million tons of coal for 14 years from a NEI Federal lease and a UII fee lease totaling 3,839 acres. Some additional land acquisition would be necessary.

This alternative would employ much the same equipment, methods, facilities, transportation and personnel described in the Alton East strip mining alternative. However, the principal sites(s) for structures would be located west of Sink Valley Wash. About 560 acres would be stripped during the life of the operation and 5 acres used for permanent deposit of initial-cut spoil. An additional 86 acres would be affected by buildings (46 acres), a main haul road (12 acres) and utilities rights-of-way (28 acres) (fig. 15).

Soils are dominantly of group 2 as described in chapter II. They are primarily formed from shales and are moderately deep. Surface layers are clay loam to silty clay and subsoils are silty clay. Reaction is about pH 8.0 throughout the soil profile. Soil impacts would be similar to those discussed for the primary mining proposal except of less magnitude. About 565 acres of soil would be disturbed by actual strip mining, and about 651 acres disturbed by the entire project. The Alton West strip mining alternative would cause less soil impact than the Alton East strip mining alternative.

The alternative would require about 200 acre-feet of water per year--about 50 acre-feet for mining activities and 150 acre-feet for the domestic needs of the increased population. Approximately 125 acre-feet of water per year would be consumed by the proposed action. Water used for mining would be consumptively used; water for domestic use in excess of sewage return would be irretrievably utilized. About half of the water used for domestic purposes would be discharged as sewage effluent. The alternative would cause similar but smaller effects on ground water than the primary proposal. Mining would irreversibly interrupt some ground-water flow. In areas where saturated beds are mined, ground-water drainage and removal would affect areas adjacent to the mine pit. Water-level declines would not be as widespread as those resulting from the primary plan because of the smaller areas involved. It is estimated that about 400 to 600 acre-feet of ground water would be affected. It is believed that the effects of drainage from ground water in the East Fork Sevier River drainage would be negligible or nonexistent because of the distance (4 miles at the nearest point) between the proposed mining area and the divide, and the relative positions of the coal beds and water table, and the presence of less permeable strata.

The impacts of the mining alternative on vegetation would tend to be similar to the primary proposal but on a much smaller scale. Based on a surface disturbance of 651 acres, the Alton West strip mining alternative

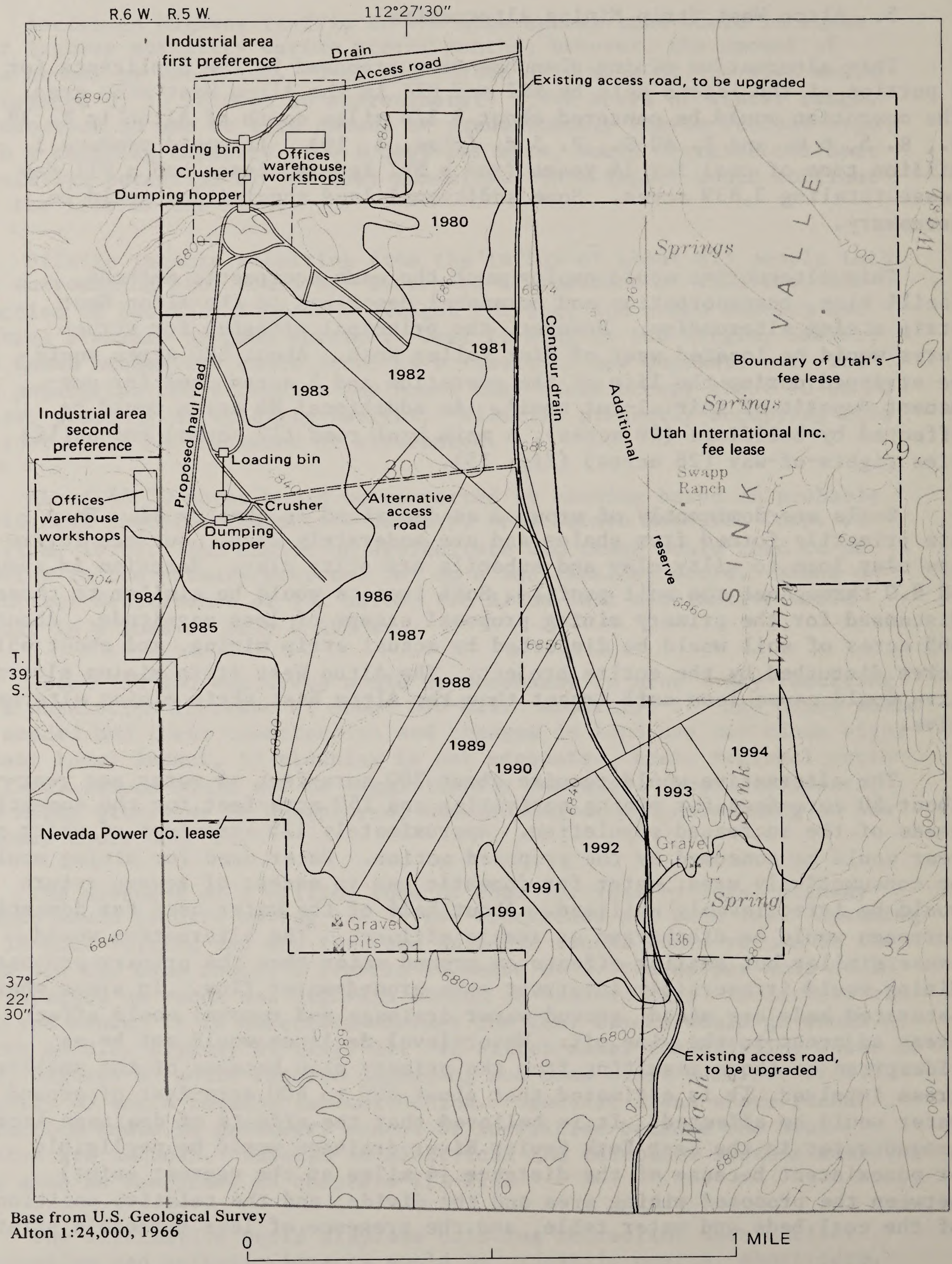

FIGURE 15.--Map showing Alton West strip-mining alternative, Kane County, Utah.

would affect about 8 percent of the area impacted by the primary proposal. In the short term, vegetation would be lost to the project. This loss would be irretrievable over the life of the project, but proper reclamation of the disturbed areas would reverse this process.

The environmental impacts on wildlife resulting from this alternative would be similar to the impacts described for the Alton East strip mining alternative. However, the total area of deer summer range disturbed would be 651 acres. This area includes 300 acres of summer turkey range, and a primary deer migration route down Kanab Creek. Overfishing could occur in the headwaters of the Virgin and Sevier Rivers and Kanab Creek.

The impact on land needed for urban uses is the same as described for Alton East. The impact on agriculture and range would tend to be similar to the primary proposal but on a much smaller scale. Based on a surface disturbance of 651 acres, the Alton West alternative would result in a short-term loss of only 4 AUM's.

The socio-economic impact is the same for Alton West and Alton East. The impact on existing transportation and utility systems would be similar to those described for the Alton East alternative except that mine haul roads would occupy about 4 acres less.

The alternative would displace existing recreation uses onsite. Impacts would be primarily onsite, short-term, and would not create any significant irreversible or irretrievable commitment of recreation uses if adequate reclamation measures are taken during the life of the project.

6. Combined Alton East and Alton West Strip Mining Alternative

Another strip mining alternative, involving the production of a total of one million tons annually from simultaneous operations in both the Alton East and Alton West mine areas, has been proposed by the applicants. Much of the same technology described for the Alton East and Alton West strip mining alternatives probably would be employed.

This alternative would require probably less than 10 more miles of temporary haul road than the Alton East or Alton West alternatives. Otherwise, effects to transportation and utility systems would be the same as described for the Alton East alternative.

Socioeconomic impacts would be similar to those of either the Alton East or Alton West strip mining alternatives. The effects on most other resources would be roughly the same in magnitude as the Alton East or Alton West resource impacts, although the precise locations of the maximum points of impact would differ.

CHAPTER IX

CONSULTATION AND COORDINATION WITH OTHERS[1]

A. FEDERAL AGENCIES

Reviews of first draft of environmental impact statement by national and (or) local offices of the Bureau of Land Management, State Director for Utah; Geological Survey; Forest Service; Fish and Wildlife Service; Soil Conservation Service and National Weather Service.

B. UTAH STATE AGENCIES

Geological and Mineral Survey, Division of Water Resources, Division of Water Rights, State Engineer, State Climatologist, Division of Wildlife Resources, Division of State Lands, Division of Parks and Recreation, Outdoor Recreation Agency, and Institute for the Study of Outdoor Recreation and Tourism, Utah State University, Logan, Utah.

C. COUNTY AND LOCAL GOVERNMENT

Southeastern Association of Governments

D. PRIVATE INDIVIDUALS AND ORGANIZATIONS, INDUSTRY AND NONINDUSTRY

Utah International Inc.: J. Leroy Balzer, Dave Crouch, Robert N. Hickman, Garth Jones, Gary Middleton and Garth Webster; and Vaughan Hansen Associates: Keith W. Welch.

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[1] See part 1 of the FES for a description of the consultation and coordination involved in the preparation of the entire FES.

CHAPTER X

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